Master Thesis

A Scientometric Method to Analyze Scientific Journals as Exemplified by the Area of Information Science

in Fulfillment of the Requirements for the Degree

Master by Research

Presented to the Faculty of Information Science

of the Saarland University (Germany) by

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in December 2007

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Magisterarbeit

Eine szientometrische Methode zur Analyse von Fachzeitschriften am Beispiel der Informationswissenschaft

zur Erlangung des akademischen Grades

Magister Artium (M.A.)

vorgelegt dem Fachbereich Informationswissenschaft

der Universität des Saarlandes von

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im Dezember 2007

Erstgutachter: Prof. Dr. Harald Zimmermann

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Introductory remarks

Version 1.0, published in Dezember 2007

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The importance of the glossary. Reading the glossary in full before starting with the first chapter is strongly recommended.

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Sydney, 29.11.2007

(Sebastian Böll)

Abstract

Background. In most academic disciplines journals play an important role in disseminating findings of research among the disciplinary community members. Understanding a discipline's body of journals is therefore of grave importance when looking for previous research, compiling an overview of previous research and and in order to make a decision regarding the best place for publishing research results. Furthermore, based on Bradford's Law of scattering, one can assume that in order to be able to compile a satisfying overview of previous research a wide range of journals has to be scanned, but also that there are some 'core' journals which are of more importance to specific disciplines than others.

Aim. This thesis aims to compile a comprehensive master list of journals which publish articles of relevance to Library and Information Science (LIS). A method to rank journals by their importance is introduced and some key characteristics of the disciplines body of journals are discussed. Databases indexing the disciplines journals are also compared.

Method. The master list of LIS journals was created by combining the journal listings of secondary sources indexing the field's literature. These sources were six databases focusing on LIS literature: *INFODATA*, *Current Contents*, *Library and Information Science Abstracts*, *Library Information Science Technology Abstracts*, *Information Science and Technology Abstracts*, and *Library Literature and Information Science*, the LIS subsection in three databases with a general focus: *Social Science Citation Index*, *Academic Search Premier*, and *Expanded Academic ASAP*, and the listing of LIS

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journals from the *Elektronische Zeitschriften Bibliothek*. Problems related to editorial policies and technical shortcomings are discussed, before comparing: predominant publication languages, places of publication, open access, peer review, and the ISI Journal Impact Factors (JIF). Journals were also ranked by the number of occurrences in multiple databases in order to identify 'core' publications. The number of journals overlapping between databases are estimated and a matrix giving the overlap is visualized using multi dimensional scaling. Lastly, the degree of journals overlapping with other disciplines is measured.

Results. A comprehensive master list of 1,205 journals publishing articles of relevance to LIS was compiled. The 968 active journals are mostly published in English, with one third of the journals coming from the US and another third from the UK and Germany. Nearly 16% of all journals are open access, 11% have a ISI-JIF, and 42% are peer reviewed. Fifteen core journal could be identified and a list of the top fourteen journals published in Germany is introduced. Databases have between five to 318 journals in common and the journal collection shows an substantial overlap with a wide range of subjects, with the biggest journal overlap with Computing Studies, and Business and Economics.

Conclusion. The aim of compiling a comprehensive list of LIS journal was achieved. The list will contribute to our understanding of scholarly communication within the LIS discipline and provide academics and practitioners with a better understanding of journals within the discipline. The ranking approach proved to be sufficient, showing good similarity with other studies over the last 40 years. The master list of LIS journals has also potential use to further research.

Acknowledgments

First of all I want to thank my parents Gerda Böll and Hans-Berthold Böll, for nourishing my interest in knowledge and for instilling an appreciation for academic achievement. I thank them most for blessing my life with the presence of my sister Nina and my two brothers Florian and Fabian. I am also deeply grateful for their support that enabled me to spend two years abroad in Australia and China, which gave me the unique opportunity to see other parts of the world which we are all sharing. I also like to mention my grandmother Hildegard Strobel for giving me moral support for doing the right thing by postponing my graduation to see other parts of the world.

I also like to thank Martin Lapp, Judith Tinnes and Andreas Fischle for their supporting emails and motivation - not just during the time of writing this thesis, but throughout my whole time at university. Also many thanks goes to the people from the Bibliometric Informetric Research Group (BIRG) at UNSW in Sydney, with special thanks to Connie Wilson and Mari Davis for devoting their time reading parts of my draft and giving me valuable feedback. Many thanks also to: Margaret Lo, Vincent Pang, Fouad Nagm, and Tjibeng Jap for making my time at UNSW a pleasant visit.

Most of all I like to thank my partner Jennifer for her love and for having so much patience with me throughout the time of writing this thesis.

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1 Introduction

"How can it be full of information? It doesn't even have a display screen."

Bundy & Matthews, 1993

Summary. This chapter will give an introduction to the background, aims, and significance of this study. The last section will give an overview of the content in all chapters.

1.1 Background

Scientometric, and more generally Informetric methods, are used in a wide range of applications. They have proven their importance, for example, in assessing the overlap between the collections of different libraries (White, 1987; Missingham & Walls, 2003), comparing the output of academic literature from different countries (Bayers, 2005), disciplines (Luukkonen, 1989), universities (Bordons, Zulueta, Romero, & Barrigon, 1999), institutions (Chen, Newman, Newman, & Rada, 1998) journals (Garfield, 1972; Nisonger, 1995) and even individual authors (Hirsch, 2005; Egghe, 2006b).

In the UK, Scientometric methods are used at regular intervals for the Research Assessment Exercise (RAE) to determine the allocation of funding to research institutions. The methods used for measurements in Scientometric/Informetric contexts range from citation analysis of individual articles (Archibald & Line, 1991), counts of books (Bolt, 1964; Lavoie & Schonfeld, 2006), overlap in databases (Stern, 1977; Jacso, 1997) and, increasingly, the Internet (Aguillo, Granadino, Ortega, & Prieto, 2005; Scharnhorst & Wouters, 2006; Onyancha & Ocholla 2007).

The idea of this study is similar to citation analysis, where the general assumption is that the number of times an article is cited is used to distinguish articles with a greater impact on the academic community than those that are rarely cited (Nicolaisen, 2007:617; Wilson, 1999a:126). In the same way as citation analysis, the number of databases that index specific journals can be used to distinguish journals of greater importance of scholars:

> Inclusion in multiple databases may be a measure of the worth or value ... in a somewhat similar way that the number of citations that articles received has been used to measure the worth or importance of articles. (Hood & Wilson, 2005:1004)

This assumption was used in a study by Forgionne & Kohli (2001) as one variable in their multiple criteria assessment of a journal's quality. However, it has not been used previously as a primary ranking criterion for a large scale ranking of several hundreds of journals relevant to LIS as done in this study.

1.2 Aims

The main goal of this thesis is to create a comprehensive list of journals in the area of Library and Information Science (LIS) or of direct relevance to

LIS. This list is analyzed to give an overview of some of the characteristics of LIS journals. These characteristics are global distribution, publication languages, peer review, and whether or not there is open access.

A secondary goal is to rank the journals in a way that reflects the importance of each journal for the discipline in a decreasing order, with 'core' journals on one end of the spectrum and increasingly less important journals on the other end.

To create the master list of LIS journals, the journal listings of secondary sources indexing the field's literature are analyzed and their journal listings combined. Those secondary sources, with one exception, comprise nine different databases that index the field's literature. Six of those databases focus exclusively on LIS literature: INFODATA, Current Contents (CC), Library and Information Science Abstracts (LISA), Library Information Science Technology Abstracts (LISTA), Information Science and Technology Abstracts (ISTA), and Library Literature and Information Science (LLIS). Three other databases have a more general focus that include LIS, among others fields: Social Science Citation Index (SSCI), Academic Search Premier (ASP), and Expanded Academic ASAP. For these databases only the subsections indexing LIS journals are analyzed. One source, not a literature reference database, is an extensive listing of electronically available journals, the Elektronische Zeitschriften Bibliothek (EZB), from which the section on LIS journals is included as well. By combining the listings from all ten sources, a comprehensive master list of LIS journals was compiled.

The thesis has two other secondary aims: an assessment of the degree of overlap between the secondary sources chosen for the compilation of the master list, and the degree of overlap between journals of relevance to LIS

and journals of relevance to other subjects. The number of journals shared between each pair of secondary sources is the first measure, the second is the number of journals shared between LIS and other disciplines.

1.3 Significance

Journals play an important role in disseminating findings of research among academic disciplines. A discipline's body of journals is of importance when looking for previous research, and when making decisions about the best place for publishing research results. The significance of research on journals is highlighted by others:

> Research into journals, their publication policies and the nature of their interrelationships is of benefit not only to individual academics but also to the general community. (Everett & Pecotich, 1991:405)

This thesis is of potential significance to all academics researching in the field of LIS, to LIS practitioners looking for professional literature, and to information services that index the literature. Because the journal master list is ranked to identify 'core' journals, other useful possibilities emerge. Nisonger (1999) notes that rankings such as this have multiple uses:

> ... journal rankings are used by scholars for manuscript submission decisions and for planning their publication agenda; for assessment of faculty performance regarding tenure, promotion, and annual raise decisions; by librarians for serials collection management decisions (...); and by journal editors for maintaining and improving the quality of their publications. (p. 1019)

Further, since the journal lists in secondary sources are used as the basis for the rankings analysis this study is not only about the LIS literature, but also about the field's secondary sources. The significance of the study here is underlined by Jacso (1998), in his statement about the significance of research on databases:

> Online and CD-ROM abstracting/indexing and full-text databases have become the mainstream tools in libraries to find information about publications ... . Studies about the journal coverage of library and information science (LIS) databases are of obvious interest for the LIS profession, and may serve also as a model for similar studies in other disciplines that have borrowed ideas and research methodologies from LIS. (p. 133ff)

Similar studies have been undertaken before (Buntrock, 1964b; Gilchrist, 1966; Dansey, 1973; Edwards, 1975; LaBorie, Halperin & White, 1985). However, there has been no recent update of these studies and in particular on secondary sources at the journal level. The importance of regular updates arises in a context of the constantly changing composition of databases as Jacso (1997) highlights: "*The source composition of a database typically changes over time, mostly by including new journals ...*" (p. 241). This thesis thus tries to fill this gap by giving a current overview of the LIS and related journals and their coverage in Abstracting and Indexing (A&I) services. The study is also important because it includes new sources not available earlier or not covered by previous studies. For example, earlier work did not cover the German database, *INFODATA*, or the relatively new database, *Library and Information Science Technology Abstracts*.

1.4 Organization

The thesis is structured in seven parts. Chapter One introduces the thesis and outlines its aims and practical significance. Chapter Two puts the study into its wider context, by giving a general introduction to the metrics, the distribution and the laws important to the field. The metric areas discussed in this section are Bibliometrics, Scientometrics, Librametrics, Webometrics and Informetrics. The main distribution is the Pareto distribution which is related to three other important laws, those of Lotka, Bradford and Zipf.

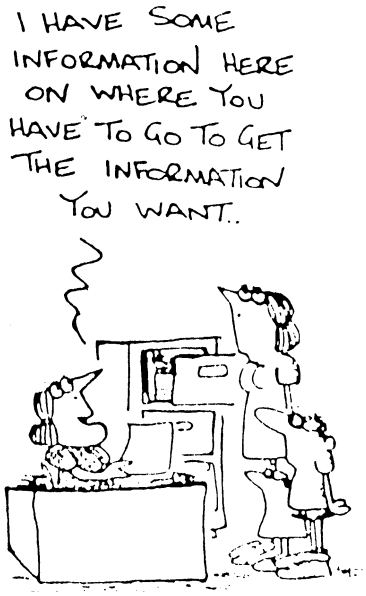
Chapter Three focuses on research in the immediate context of the study. Three areas of research of importance to this thesis are discussed in detail. These areas are: research related to the ranking of LIS journals; studies on the overlap of databases; and research on secondary services for literature research in LIS.

Chapter Four, the methodological background of this study is explained. First, the databases used for this study are introduced, followed by a description of the methodological problems faced when matching up journal titles from different sources. Third, the compilation of the master list is described. The last section describes the methodology used for estimating the overlap of journals of relevance to LIS with journals of use in other disciplines.

The results of the study are introduced in Chapter Five. After an overview over the general results, details of the ranking of the list for all active journals are presented. Following this, an overview of characteristics of LIS journals used in this study and their distribution in the secondary sources is given. The characteristics are: peer-review, language, geographical distribution, Open Access, and Journal Impact Factors (JIF). This chapter also includes a section devoted to LIS journals from Germany. The overlap between all ten databases is discussed . The last section presents the results of the analysis of the overlap of LIS with fifteen other disciplines.

Chapter Six outlines the wider implications of this thesis and direct comparisons with previous studies are highlighted. The implications of the analysis of the ten databases used as sources for this thesis are discussed. The findings from this study are summed up in the conclusion in Chapter Seven. It's limitations and contributions are highlighted and directions for further research are given.

2 Theoretical Background



Bundy & Matthews, 1993

Summary. This chapter will firstly give definitions and examples of the uses of basic metric terms in the area of information science. Secondly the basic nature of metric distribution will be discussed and exemplified in three cases: Lotka's Law, Bradford's Law and Zipf's Law.

2.1 The Metrics of Library and Information Science

Over the last few decades the field of Library and Information Science (LIS) has developed several quantitative methods for investigation. As LIS is a widely interdisciplinary field (Nisonger & Davis, 2005:375), academics from various disciplines (including LIS) have played a part in the development of its methods. Often scientists with a different background from LIS, like Tibor Braun (Chemistry) or Vasily Nalimov (Philosophy), have contributed important concepts.

The suffix 'metrics' is "*derived either from the Latin or Greek word "metricus" or "metrikos" respectively, each meaning measurement*" (Sengupta, 1992:76). To date several different metric fields that deal with the development and application of measurement in the area of Information Science have emerged, namely: Bibliometrics, Scientometrics, Informetrics, Librametircs, and more recent in, Webometrics. However, all these fields are closely related, especially Bibliometrics, Informetrics and Scientometrics, and have significant overlap:

> ... it may be pertinent to mention here that the overlapping between these terms, especially between bibliometrics, informetrics and scientometrics, is so much that it really is very difficult to put a static line of demarcation between them. Some of the works of bibliometrics may be very easily classified as informetric or scientometric studies and vice versa. (Sengupta, 1992:92)

> ... each of these terms has a range of definitions that have been applied to them by the authors who are working in this field. These definitions indicate considerable overlap in meaning of the terms, but they are not necessarily synonymous. (Hood & Wilson, 2001a:309)

For that reason, even though this study is called a Scientometric analysis, the origin for all the metric fields of Information Science will be introduced, and various definitions for each of them will be discussed.

2.1.1 Bibliometrics

The first definition of Bibliometrics was given by Pritchard in 1969. He suggested this term because *statistical bibliography*, the term used up to that time, had some ambiguity as it could also be interpreted as bibliographies on statistics. His definition describes the aim of Bibliometrics as the following:

> ...to shed light on the processes of written communication and of the nature and course of development of a discipline (in so far as this is displayed through written communication), by means of counting and

> analysing the various facets of written communication ... the application of mathematics and statistical methods to books and other media of communication. (Pritchard, 1969:348ff.)

Fairthorne describes it in the same year even wider to include behavioral aspects of communication as the "*...quantitative treatment of the properties of recorded discourse and behaviour appertaining to it.*" (Fairthorne, 1969:329).

These definitions have been widely accepted and cited and in 1970 the term Bibliometrics appeared as a descriptor term in two Databases: *Library Literature* and *Library and Information Science Abstracts (LISA*). By 1980 it had made its way to become a *Library of Congress* subject heading (Broadus, 1987b:374). The first extensive review article of the field was by Narin & Moll (1977) and appeared in the prestigious *Annual Review of Information Science and Technology (ARIST)* just eight years after Pritchard's first suggestion of the term. The next review to appear in ARIST was by White & McCain (1989), which gave a somewhat narrower definition than Pritchard, limiting the scope of Biliometrics to bibliographies. Their definition also shows some overlap with Scientometrics, a fact that will be clearer after reading the next section (2.1.2):

> Bibliometrics is the quantitative study of literatures as they are reflected in bibliographies. Its task, immodestly enough, is to provide evolutionary models of science, technology and scholarship.
> (White & McCain, 1989:119)

To summarise the definitions reviewed so far a short definition of Bibliometrics that also includes Zipf's law (See chapter 2.2.4) could be therefore: *Bibliometrics can be described as the analysis of written communication for repetitive patterns that can be described in mathematical terms.*

2 Theoretical Background

The method used in Bibliometric studies is mainly the counting of Bibliometric units and then ranking them in order of occurrence, thus drawing conclusions from their frequencies. The most important way of undertaking this frequency measurement is *citation analysis*[1]. However, there is more to Bibliometrics than just the creation of citation indexes[2]. For that reason, even though the tradition of creating citation indexes reaches far back the first works in the area of Bibliometrics have emerged only about a century ago.[3]

The first study in Bibliometrics was according to Hood & Wilson (2001a) the work of Campbell (1896). However, most overviews give Hulme (1923) and Cole & Eales (1917) as the earliest work in Bibliometrics, a fact that may be attributed to them being listed in Pritchard's initial paper (Pritchard, 1969).

Further overviews and examples of Bibliometrics not mentioned above are Ball & Tunger (2005, 2006), Broadus (1987a) and Brookes (1988). Brookes (1990) brings together the origins of Information Science and Documentation Science in relation to Bibliometrics and Hertzel (1987) provides a

[1]As Citation Analysis is not used in this study it won't be discussed in detail. For an overview see for example: Nicolaisen (2007); Ritberger & Harms (2003) and Smith (1981). A more critical discussion of citation analysis can be found at, for example, MacRoberts & MacRoberts (1989), Sandison (1989) and Stock (2001). More advanced methods of citation analysis are Co-citation Analysis (Small, 1973) and Bibliographic Coupling (Kessler, 1963).

[2]The first promotion of citation indexes in science came from Garfield (1955). An early discussion of them is Weinstock (1971). Carpenter & Narin (1981) discuss the oldest comprehensive citation index in science the SCI (Science Citation Index) and Norris & Oppenheim (2007) give an overview of the more recent alternatives to the early citation indexes, namely Scopus, Google Schoolar and CSA Illumina,

[3]"*The use of citation indexes have been demonstrated as far back as 1743 and publication counts have also been located in legal writings since at least 1817. Weinberg (1997) shows that Hebrew citation indexes are even earlier still and date from about the 12th century.*" (Hood & Wilson, 2001a:292)

detailed overview of the history of Bibliometrics. An example of a Bibliometric study in LIS is a comparison of the internationalization of Library and Information Science Journals over 22 years (Sin, 2005).

2.1.2 Scientometrics

The focus of Scientometrics is the measurement of science and is therefore concerned with the growth, structure, interrelationship and productivity of scientific disciplines (Hood & Wilson, 2001a, 291). In contrast to Bibliometrics, the basis for Scientometric analysis is not limited to written communication only but can also include various other sources as well, for example the analysis of the funding of institutes, the number of PhD students or various other units:

> ... there is more to science and technology for scientometricians to measure and analyze than its literature output; e.g., the practices of researchers, the socio-organizational structures, research and development management, the role of science and technology in the national economy, governmental policies towards science and technology, and so on. (Hood & Wilson, 2001a:293ff.)

However, it is important to note that the written communication analyzed in Scientometric studies is limited to scientific literature only. For that reason many of the studies undertaken in the field of Scientometrics could also be defined as Bibliometric:

> Much of scientometrics is indistinguishable from bibliometrics, and much bibliometric research is published in the journal, *Scientometrics*. After all, the immediate and tangible output of science and technology into the public domain is literature (papers, patents, etc).
> (Hood & Wilson, 2001a:293)

An exhaustive definition must therefore include the fact that there is more to Scientometrics than just literature analysis, but also that to some extent

Scientometrics is in fact Bibliometrics as well. Such a definition is given by Tague-Sutcliffe:

> Scientometrics is the study of the quantitative aspects of science as a discipline or economic activity. It is part of the sociology of science and has application to science policy-making. It involves quantitative studies of scientific activities, including, among others, publication, and so overlaps bibliometrics to some extent. (Tague-Sutcliffe, 1992:1)

The advent of the discipline was in 1978, when the journal *Scientometrics* was found by Tibor Braun in Hungary.[4] *Scientometrics* defines its content as the following: "*Scientometrics includes all quantitative aspects of the science of science, communication in science, and science policy.*" (Wilson, 1999a :110). The origins of the term Scientometrics reach further back, when two Russian scientists Namilov and Mulchenko coined the Russian term 'naukometriya', the Russian equivalent of the term Scientometrics (Nalimov & Mulechenko, 1969; Nalimov, 1970). Namilov later became the first consulting editor of *Scientometrics* (Hood & Wilson, 2001a:293). However, Price (1963) may be seen as the first to explore this area, in stating the aim of his book as: "*to deal statistically ... with general problems of the shape and size of science and the ground rules governing growth and behavior of science-in-the-large*" (Price, 1963, cited in Bensman, 2007:126),

Further overviews and examples of Scientometric research are given by Umstätter (2004) in the German handbook for the area of Information Science called *Grundlagen der praktischen Information und Dokumentation* (free translation: Foundations of applied Information and Documentation) or a State-of-the-Art by Van Raan (1997). Examples of Scientometric studies are Schlögl (2000) where he makes extensive use of Co-citation analysis to

[4]Homepage of Tibor Bown ►http://www.chem.elte.hu/departments/anal/braun.html and ►http://tibor-braun.freeweb.hu/

identify the relation between different authors in the area of information management. Two other examples are Pfrang & Schneider (2006), a study on the development of the international visibility of the research output of Psychology in Germany and Bayers (2005), showing how ISI data can be used to assess German research output.

2.1.3 Librametrics

Librametrics, though the oldest, is the the least used of the metric terms in library and information Science (LIS). It stems from the term 'librametry' which was proposed by Ranganathan in 1948 at the Annual Aslib conference as a generic description for the application of mathematical and statistical techniques to library problems. Therefore it is defined as the:

> *Quantitative analysis of various facets of library activities and library documents by application of mathematical and statistical calculus to seek solution to library problems.*
> (Sengupta, 1985, cited in Sengupta, 1992:88)

> *... the measurement of all quantitative data directly related to libraries.*
> (Brookes, 1990:40)

or the study of

> *... information processes and information handling in libraries and information centres by quantitatively analysing the characteristics and behaviour of documents, library staff and library users.*
> (Ravichandra Rao, 1981, cited in Ravichandra Rao & Neelameghan, 1992:243).

Ranganathan used statistical methods, for example, to arrange the order of books in the stack room, putting the most frequently demanded books next to the entrance, and the least requested furthest away. By this means he ensured that the library staff would have to walk the shortest distance possible to retrieve the most requested books. He also used Librametric meth-

ods for various other tasks: analyzing user requests, circulation and arrangement of books and periodicals; optimizing the workload and staff deployment; budget allocation; and even the physical planning of libraries. For more details on each of this areas see Ravichandra Rao & Neelameghan (1992) and to some extent Sengupta (1992).

Unfortunately the term Librametry has not been widely adopted, which sometimes leads to confusion between librarians and information scientists, who interpret Bibliometrics and its results from different perspectives. A problem probably most apparent is in the matter of obsolescence, where librarians have difficulties agreeing that any work might ever be out of date, as Brookes (1990) points out:

> ... I could never persuade them that my problems in information science were different from theirs in respect of libraries. And this dispute, recorded in the pages of various journals over several years has never been resolved. (Brookes, 1990:41)

The first study, using techniques associated with Librametry, can be traced even further back than 1896[5], when Jewett (1848) presented his report which traced references, in two areas (international law and chemistry) to ascertain their availability from American libraries (Broadus, 1987a). Another early study referred to by Broadus (1987), was Gross & Gross (1927). Using quantitative analysis the authors compiled a list of chemistry journals recommended for subscription by college libraries.

This section may be summed up by quoting Wilson (1999a) on Librametrics:

> There may be value in retaining the terms 'librametrics' or 'librametry' for such studies not specifically analyzing literatures, or at least not specifically directed to the goals of bibliometrics and of information retrieval. These include analyses of book circulation ... , of library collection overlap ... , of library acquisitions ... , of fines policy ... , and

[5]See chapter 2.1.1 for the first studies in the area of Bibliometrics.

> of shelf allocation ... – frequently using optimization techniques from operations research. (Wilson, 1999a:110)

2.1.4 Webometrics and Cybermetrics

The term *Webometrics* was coined by Abraham (1997); however it took several years to become the generic term for the description of the quantitative study of the Web and its related phenomena. In the early years of Webometrics several other terms were used, among them *Web Bibliometry* (Chakrabarti, Dom, Kumar, Raghavan, Rajagopalan, Tomkins, 1999), *Internetometrics* (Almind & Ingwersen, 1996), *Cybermetrics* (Shiri, 1998) or in computer science *Web metrics* (Dhyani, Keong, Bhowmick, 2002). Today the term Webometrics is established. However, the main journal in Webometrics still carries the name *Cybermetrics.*[6]

Thelwall & Vaughan (2004) defined the aim of Webometrics as follows: "*Webometrics encompasses all quantitative studies of Web-related phenomena.*" (p. 1213) and Björneborn & Ingwersen (2001) describe it as "*investigating the nature and properties of the Web drawing on modern informetric methodologies*" (p. 65). In 2004 Björneborn defines it slightly differently, separating Webometrics from Cybermetrics. He defines Webometrics as:

> The study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web drawing on bibliometric and informetric approaches. (Björneborn, 2004:12)

and Cybermetrics more broadly as:

> The study of the quantitative aspects of the construction and use of information resources, structures and technologies on the whole Internet drawing on bibliometric and informetric approaches. (Björneborn, 2004:13)

[6]Cybermetrics: ISSN 1137-5019; Online: ►http://www.cindoc.csic.es/cybermetrics/

According to Björneborn & Ingwersen (2004) the aim of Webometric research therefore includes the following aspects of the web: content analysis, link structure analysis, usage analysis (including search engines) and the analysis of web technology (including search engine performance). Cybermetrics, however, encompasses on top of that all forms of computer-mediated communication, like statistical studies of discussion groups or mailing lists (see for example, Herring, 2002) and studies on the topology of the net (see for example Molyneux & Williams, 1999). In information science the most cited model in the latter area is the description of the web as having a bow tie like structure, with a strong connected core (the knot of the bow tie) connected to inlinking and outlinking pages – the two ends of the bow tie (Broder, Kumar, Maghoul, Raghavan, Rajagopalan, Stata, Tomkins, Wiener, 2000). Cybermetrics is closely related to computer science, sharing interests in fields such as: cyber cartography, cyber geography, Web ecology, Web archology, Web mining, Web graph analysis, Web dynamics and Web intelligence.

Webometrics on the other hand, is the extension of classic bibliometric and informetric methods to the internet. Comparing links with citations and references, inlinks (links pointing to a page) are the equivalent of citations and outlinks (links going away from a page) are the equivalent of references. However, Webometry faces various problems that are related to the web and are not present in classic bibliometric studies. As Björneborn & Ingwersen (2001) explain:

> ... the Web increasingly becomes a web of uncertainty to its users; the thin red line between opaqueness, shading truth, misinformation, beliefs, opinions, visions or speculation and reliability, validity, quality, relevance or truth becomes increasingly thinner. (p. 69)

This "*messiness of Web data*" (Thelwall, Vaughan, Björneborn, 2005:81) therefore demands elaborate methods and heuristics for cleaning up the data before analysis can be carried out. Other problems are of a more technical nature, as most studies use crawlers to gain the necessary data for analysis, which are exposed to all the problems which are related to the so called *deep web*.[7]

Further studies and overviews on Webometrics are, for example, Ingwersen's (1998) work on web impact factors, a method of comparing websites and domains by looking at the number of links pointing to them. Other studies comparing websites are, for example, Smith (1999), or Aguillo et al. (2005). A critical review on the use of web impact factors comparing pages from different countries is given by Noruzi (2006). Mayr & Tosques (2005) compared the use of Google's web interface to the Google API (Application Programming Interfaces) for Webometric studies and Pernik & Schlögl (2006) analyzed the linkage patterns between Information Science research institutions in Germany, Austria and Switzerland. Overviews on Webometry are given by Bar-Ilan & Peritz (2002), Thelwall et al. (2005) and Thelwall & Ruschenburg (2006).

2.1.5 Informetrics

The term Informetrics originated from Germany and was first used in 1979 in both West Germany and East Germany (Nacke, 1979; Blackert & Siegel, 1979). However, the paper written by Blackert & Siegel deals mostly with the area which they call 'Wissenschaftsmetric', the German equivalent for

[7] One of the first works on the deep Web was Bergman (2000). Problems with data gathering are, for example: pages that need authentification or pages that prohibit crawling in their robot.txt.

Scientometrics, and remains very unclear about the scope of Informetrics. For that reason the first definition of Informetrics formulated by Otto Nacke shall be given here:

> Informetrie ist die Lehre von der Anwendung mathematischer Methoden auf die Sachverhalte des Informationswesens zur Beschreibung und Analyse ihrer Phänomene, zum Auffinden ihrer Gesetze und zur Unterstützung ihrer Entscheidungen. (Nacke, 1979:220)
>
> [Author's translation: Informetrics is the teachings of the application of mathematical methods to the facts of Information Science to describe and analyze its phenomenons, find its laws and for the support of its decisions.]

Nacke justified the introduction of Informetrics as a new discipline because of the lack of other disciplines like Bibliometrics or Scientometrics to subsume all aspects of the mathematical view on problems in the area of information science:

> Alle schränken ihr Geltungsgebiet entweder durch die Benennung oder durch die Definition entweder im mathematischen oder im informationswissenschaftlichen Bereich auf Teilgebiete dieser Disziplin ein, ... Es fehlt also bisher ein Ausdruck, der diese Einschränkung im mathematischen oder informationswissenschaftlichen Bereich wegläßt und damit den gesamten Überschneidungsbereich der beiden Disziplinen abdeckt. (Nacke, 1979:220)
>
> [Author's translation: All limit their scope either through their naming or through their definition either in the area of mathematics or information science to a subarea of the discipline. ... So far a term is missing, that omits these limitations in the area of mathematics or information science and therefore covers the whole overlap of both disciplines.]

However, he also alerts the reader that Informetrics is not the solution to all problems in Information Science:

> Nicht alle Probleme der Informationswissenschaft sind mathematisierbar, und nicht alle mathematisierbaren Probleme können auch mathematisch behandelt werden. (Nacke, 1979:224)

> [Author's translation: Not all problems in information science can be described in mathematical terms and not all problems that can be described mathematically can be dealt with using mathematics.]

Very similar to Nacke's first definition is the short definition used by Egghe & Rousseau (1990) as a subtitle for their book, subsuming all quantitative methods in the area of LIS as Informetrics: "*Informetrics: Quantitative Methods in Library, Documentation and Information Science*" and the description given by Stock & Weber (2006), "*Informetrics includes therefore all quantitative studies in information science*" (p. 385). In order to further clarify the content of Informetrics and to clarify its extension into all the ares described above, another commonly adapted definition of Informetrics, with more focus on the content and aim of this discipline, shall be given:

> Informetrics is the study of the quantitative aspects of information in any form, not just records or bibliographies, and in any social group, not just scientists. Thus it looks at the quantitative aspects of informal or spoken communication, as well as recorded, and of information needs and uses of the disadvantaged, not just the intellectual elite. It can incorporate, utilise, and extend the many studies of the measurement of information that lie outside the boundaries of both bibliometrics and scientometrics. … Two phenomena that have not, in the past, been seen as a part of bibliometrics or scientometrics, but fit comfortably within the scope of informetrics are: definition and measurement of information, and types and characteristics of retrieval performance measures. (Tague-Sutcliffe, 1992:1)

Wilson (1999a) distinguishes the following broad areas of Informetrics in her review: *citation analysis*, *word-related analyses*, *author-related analyses*, *time and growth studies* and the *Informetric laws* (see chapter 2.2). However, the demarcation line between these areas is not strict as one, can for example, also have time-based citation analysis. The main focus of her review is dealing with the Informetric laws, describing the common principles underlaying the stochastic distributions of the different laws, thus suggest-

ing that an important component of Informetrics is dealing with the theoretical and mathematical principles underlaying quantitative studies in LIS.

Concluding, one can say that Informetrics is the broadest of all the metric terms in the area of LIS, encompasing all aspects of the other areas as visualized in this figure taken from Björneborn & Ingwersen (2004):

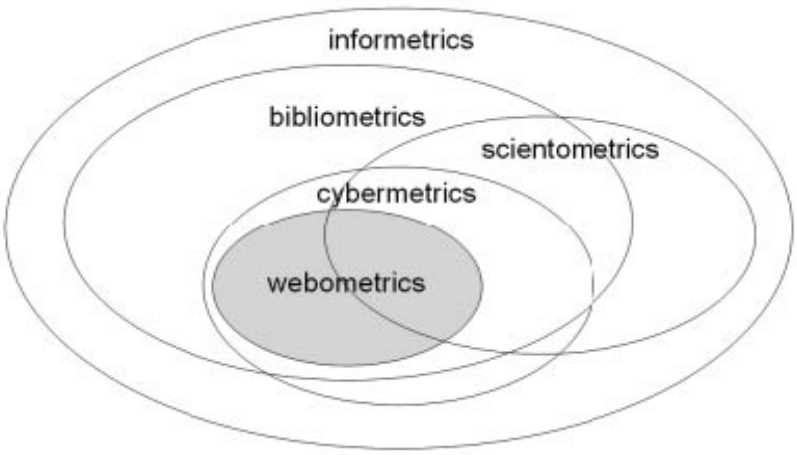


Figure 2.1: Relationship of the Metrics of LIS

Further overviews and examples on Informetrics not mentioned above are Nacke, Wehmeier, & Eisenhardt (1980), a paper describing Informetric research and giving a list of examples for the use of Informetric methods. Another overview on Informetrics can be found in an special issue of *Information Wissenschaft und Praxis* (Stock & Weber, 2006). Examples of papers dealing with methodical problems related to metric research are Bandyopadhyay (2000), concerning the assignment of ranks, and Ingwersen & Christensen (1997) alerting the reader of the pitfalls of Informetric research using databases.

2.2 The Metric Distributions

Summary. To understand the phenomena studied in the Scientometric / Informetric context, one has to understand that the prevalent distribution that underlies these phenomena is different from the type of distribution prevalent in other disciplines. Therefore, this section will first give an overview of the distribution underlying research in this field. Based on this introduction, the work of three people who have been so important for the development of the field will be introduced. Their discoveries have been labeled 'laws': Lotka, Zipf and Bradford.

2.2.1 The Nature of Metric Distributions

Bookstein (1976:416) states that "*One of the most remarkable discoveries of information science is the recurrence ... of a small number of basic distributions*" After introducing Lotka's Law, Zipf's Law and Bradford's Law he continues "*The distributions are approximately the same; it is only the entities and events that differ*" (Bookstein, 1976:419). The nature of the distribution underlying research in LIS is different from the Gaussian normal distribution that is prevalent in other subjects. Where the Gaussian normal distribution has a symmetric, bell-like shape that allows, for example, the calculation of a mean, the distribution underlying Informetric processes is skewed in its shape, which makes the use of mean values often inappropriate as they cannot describe an important property of the shape of the underlaying distribution. An example of Gaussian normal distributions is displayed in Figure 2.2.

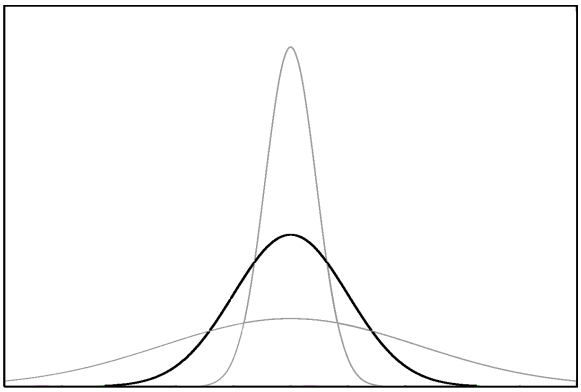


Figure 2.2: Shape of Gaussian Distributions

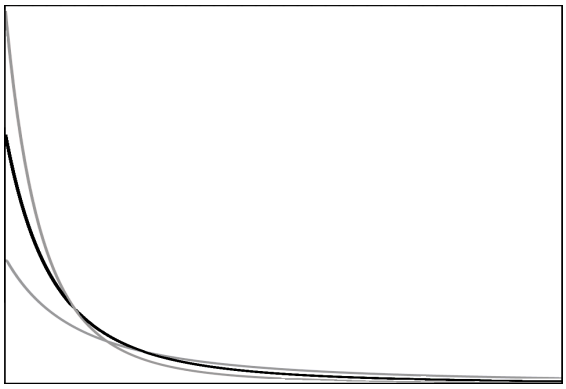


Figure 2.3: Shape of Pareto-like Distributions

Wilson, 1999a describes the nature of metric distributions as follows:

> What they have in common is the form of the distribution ..., which, when appropriately displayed, is variously described as extremely right-skewed reversed-J-shaped, or quasi-hyperbolic. ... This shape contrasts strongly with the bell-shaped, normal or Gaussian distribution, seemingly so prevalent and on which so much of contemporary statistics, or at least of its applications, is based. (Wilson, 1999a:166)

An example of distributions of this kind is displayed in Figure 2.3. The first academic that reported a distribution with this shape and gained wider attention for it was Pareto (1897) with his study on the distribution of wealth in Italy. Hence, distributions with this shape are also sometimes referred to as Pareto distributions.

Following Pareto, other academics have found similar kinds of distributions; for example, Willis (1922) on the geographical distribution of species, Simon (1972) for the size of cities, Mandelbrot (1963) for the size of islands in an archipelago or the distribution of minerals over landmass. In relation to LIS, several early works showed a Pareto-like distribution: Lotka (1926) for the productivity of scientists, Bradford (1934) for the distribution of literature on a topic over journals and Zipf (1935) for the occurrence of words in literary works.

The nature of the common properties of distributions in LIS have been discussed more thoroughly in a number of publications. Earlier works which tried to bring together the properties of the different laws by Lotka, Zipf and Bradfort are, for example, Brookes (1968), Bookstein (1979), Fairthorne (1969) and Price (1976). A more mathematical approach has been taken by a number of authors, for example, Sichel (1985), in a series of papers, Haitun (1982a, 1982b, 1982c), Rousseau & Rousseau (2000) and Egghe (2005). In her review on Informetrics, Wilson (1999a) gives a good overview of the different mathematical models discussed for underlying Informetric / Scientometric distributions.

2.2.2 Lotka's Law

The first of the three laws important to Informetric research was introduced by Lotka, (1926). He was interested in the productivity of scientists and called his discovery *the frequency distribution of scientific productivity*. Despite the attention Lotka's finding has received since then, it took fifteen years for his publication to be cited for the first time by Davis (1941) and another eight years before it was labeled Lotka's Law (Zipf, 1949).

Lotka analyzed the number of contributions that have been made by different authors in two disciplines: Chemistry and Physics. For Chemistry he analyzed 6,891 entries in *Chemical Abstracts*, 1907-1916, for the names starting with the letters A and B. He could show that 58% of all authors contributed just one publication and that the number of authors with 2, 3, 4, ... contributions decreased exponentially. To see if this was also the case when the quality of publications is taken into consideration, he also looked at the number of times authors were listed in Auerbach's *Geschichtstafeln der Physik*, reasoning that only important contributions to Physics would

be listed there. Again out of all 1,325 entries for the whole alphabet 59% of the authors were listed just once, with the number of authors listed more than once decreasing exponentially. Hence, when the number of contributions for both Chemistry and Physics were plotted over the number of authors, the result was a Pareto-like distribution. This relationship can also be described as:

> ... the number of authors who had published a specific number of papers was approximately equal to the inverse square of that number multiplied by the number of authors who had published one paper only. (Wilson, 1999a:165)

Therefore Lotka's Law is sometimes also known as the inverse square law. Lotka phrased the relationship himself as "*the number* [of authors] *making* n *contributions is about* $1/n^2$ *of those making one*", but was highlighting the fact that "*this simple law*" underestimates the number of "*persons of very great productivity*"(Lotka, 1926:323).

The importance of Lotka's finding was summed up by Bookstein as:

> "The burden of publications is thus unevenly divided, with most scientists contributing rather infrequently, while a small number of scientists publish disproportionately frequently." (Bookstein, 1979:153)

However, Price states that the number of publications is not only affected by the productivity of one author, but also by the timespan that a person is actively publishing: "*authors differ not so much in their* rate *of publication of papers, but in the span of* time *they spend at the publication front*" (Price, 1976:300). For reviews on Lotka's Law see, for example, Murphy (1973) and Potter (1981).

2.2.3 Bradford's Law

Bradford's (1934; 1937; 1953) name is associated with the scatter of relevant literature on a subject over journals. Therefore, it is sometimes also referred to as the 'Bradford's law of scattering'. He states that one could assume:

> ... that the bulk of the papers on a specific subject would be published in a few journals specially devoted to that subject, or to the major subject of which it forms a part, together with certain border-line journals and some more general periodicals. (Bradford, 1934:176)

However, he showed that this assumption was trivial and does not reflect the real situation. Even though there are several publications which are of major importance for the literature of one subject, they only contain a fraction of the relevant literature. Most of the literature associated with a field is published in an increasing number of journals, a lot of them published in journals with fewer than one relevant article per year. For this reason, Bradford was also demanding that subject-specific indexing of literature should be abolished in favor of source-related literature, as subject-specific indexing misses a large number of relevant literature published in journals not scanned by the indexers. In relation to libraries he also concludes that:

> “special libraries cannot gather together the complete literature of their subject, except by relinquishing altogether their specific character and becoming practically general libraries of science.” (Bradford, 1934:180)

Bradford made this observation when arranging journals in decreasing order of productivity. In a graphical plot the distribution of articles over journals follow therefore a Pareto-like distribution. If the journal then split into zones with an equal number of articles in them, the number of journals in each zone increased exponentially. Bradford formulated this relation as “*the number of periodicals in the nucleus and succeeding zones will be as 1 : n*[1]

: n^2 ...” (Bradford, 1934:178). This relationship between the number of articles on a subject and the number of journals they are published in was later reformulated with more mathematical descriptions by Vickery (1948) and Leimkuhler (1967). A review on articles of Bradford's Law is given by Lockett (1989); Groos (1967) originated the *Groos droop*, often referred to in describing Bradford's Law to explain the incomplete data for the unproductive (or 'tail') journals.

2.2.4 Zipf's Law

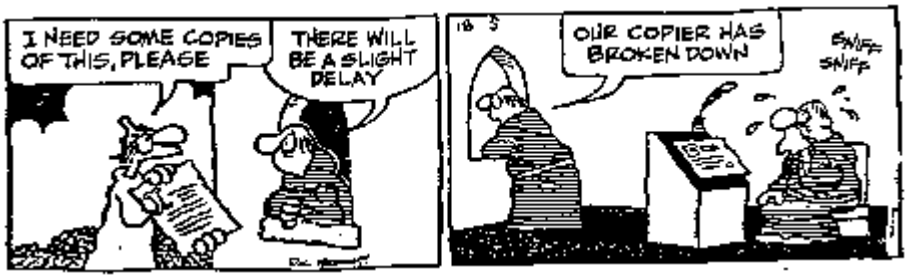
The last of the three laws was postulated by Zipf (1935; 1949). Zipf analyzed the number of different words that appeared in a body of text and then ranked them by their number of occurrences. One of his examples, the text of James Joyce's 'Ulysses', had 29,899 different words and a total of 260,430 words, which means that on average each word appeared 8.7 times. However, the distribution of the different words in 'Ulysses' was by no means evenly spread; it followed a very skewed distribution with roughly one third of the words appearing just once and just ten of the words appearing more than 2,650 times each. Therefore, when the number of occurrences is plotted over the word rankings, the distribution has a Pareto-like shape. Zipf formulated this relationship as the rank times the number of occurrences being a constant:

> ...we have found a clearcut correlation between the number of different words ... and the frequency of their usage, in the sense that they approximate the simple equation of an equilateral hyperbola: r * f = c (Zipf, 1949:24)

The method used by Zipf of plotting the frequency over rank has also become known as the rank-frequency distribution or the Zipf-like plot and is now widely used outside the context of the usage of words in a body of text.

Zipf's law has also been validated for languages other then English, Bookstein (1979) lists, for example, German and Finnish as well. Mandelbrot (1961) developed Zipf's law further so it is now sometimes referred to as the Zipf-Mandelbrot Law (Egghe, 1999). Further discussions of Zipf's Law can be found, for example, in Hill (1974) and Woodroofe & Hill (1975).

3 Related Works



Bundy & Matthews, 1993

Summary. Previous work related to this thesis can be divided into three broad areas. First, studies ranking journals of relevance to LIS are introduced. The second area is devoted to studies on overlap of literature reference databases. And the last area discusses studies related to secondary sources that index literature of relevance to LIS.

3.1 Ranking of LIS Journals

Summary. This section gives an overview of previous research on journal rankings of LIS journals. The discussed rankings and ranking methods are divided into four main areas: rankings based on subjective judgment; rankings based on citations; rankings based on productivity; and rankings based on other criteria. Some studies combine methods from different areas and may be discussed more than once. For a general overview of techniques used for journal evaluation, see Rousseau (2002). A good overview of 178 different rankings of LIS journals between 1952 and 1997 is given by Nisonger (1999).

3.1.1 Journal Rankings Based on Subjective Judgment

A number of methods for ranking of journals are subsumed under this descriptive term *subjective based rankings*. All rankings subsumed under this umbrella are based on the subjective judgments of individuals. Rankings based on subjective judgment are sometimes called *rating based rankings*. This name stems from the fact that a common method used for this approach gives participants a list of journals which they have to rate on a Likert-like scale according to their preferences, for example, 1 = outstanding to 5 = poor. The overall ranking is then based on the average ranking of all recipients. Another method that falls in this area is based on a list of the top-three, -five, -ten, journals listed by each participant for different criteria, for example, the most prestigious journals, the most often read journals, or the best place for publication. The total ranking of journals is then based on how often a journal is named on all lists taken together. An important difference between both methods exists, however. The first is a closed end survey of a fixed number of journals and the second is a open ended survey, where the total number of journals depends on the participants. An important study that used both approaches is Kohl & Davis (1985). Even though the study was initially criticized by McGrath (1987) it since has been repeated several times, last by Nisonger & Davis (2005). Both studies compared the judgments from deans of LIS faculties to those from directors of research libraries by asking them which journals they consider most important for tenure and promotion. Not surprisingly, both groups differed in their views on some journals, but also showed significant similarities for others. Comparing the results over two decades shows considerable continuity in the perception of journals. Over this period two Library Science journals: *American Libraries* and *Library Journal* decreased drastically in

rank, while two Information Science journals: *Scientometrics* and *MIS Quarterly* increased substantially. A modification of the deans versus directors approach has been taken by Tjoumas & Blake (1992) comparing the perception of journals by faculties oriented more towards public librarianship with faculties oriented more towards school librarianship.

Another example of subjective ranking are questions addressed to the professional and general readership. One of the earliest studies using this approach is Hanson & Tilbury (1963) which asked participants of the 1962 Aslib Conference about their reading behavior. A more recent study of this kind, addressed to the German speaking LIS community, is part of a bigger joint research project on LIS journals between the universities of Cologne in Germany and Graz in Austria (Colonia Grazia, 2002; Schlögl & Stock, 2004).

Generally supporters of subjective rankings state that they can measure differences in journal perception not reflected in other measurements:

> ... expert perception can reflect subtle nuances of journal value not readily captured by citation data or other objective measures and that perception rankings reflect the collective judgment of domain specialists whose knowledge of the field and its journals may reasonably be presumed. (Nisonger & Davis, 2005:342)

It is also important to state that surveys of the prestige of journals are an improvement to the previous situation where promotion was "*limited to quantitative research output*" (Tjoumas & Blake, 1992:174). However, on the down side, subjective rankings may be influenced by the familiarity of academics with specific journal titles rather than with journal quality (Levin & Kratochwill, 1976). Such rankings also suffer from the problem that the number of journals used in a survey is limited which means that important titles may be missing. Another problem is that the perception of journals

differs for different stakeholders and that therefore different groups will produce different rankings for the same journals. This is especially an issue for diverse fields like LIS. Generally one should be aware that the "*prestige of a journal is only an indication, not a guarantee of the quality of its articles*" (Kohl & Davis, 1985:47).

3.1.2 Journal Rankings Based on Citations

Citation based rankings are sometimes called *usage based rankings*, as a reference to an article indicates that the article has been used by others. The idea is that the more often an article is referenced, the more often it has been used by others, thus the usage of journals can be ranked by looking at the extend to which its articles have been cited by others. Citation analysis for journal rankings are widely discussed, for example, by Garfield (1972, 1979), and Stock (2001). However, the term *usage based ranking* is deceptive because it does not take account of "*nonpublishing readers who were inspired by an article they read and who may later even be able to translate some new ideas from it successfully into practice*" (Schlögl & Stock, 2004:1155).

The earliest approaches using citation analysis for journal ranking were based on total citation counts. Total citation counts means that one takes a specific set of literature as a seed, for example, all articles published in a specific set of journals over a fixed time frame, and then counts the number of references made by this set to other journals. As the total amount of citations made to another journal determines a journal's rank, this approach is called the total citation method. This approach was used for the first time by Gross & Gross (1927), but it was not applied to LIS until Gilchrist (1966). The downside of the total citations approach is that it favors journals which

are ether older or publish more articles since they have a greater range of articles that can be cited then smaller or newly established journals do.

The Journal Impact Factor (JIF) overcomes this limitations by normalizing citations counts to a measure not influenced by the number of articles published or the age of a journal. JIF is asociated with the name of Eugene Garfield, founder of the Institute of Scientific Information (ISI) who developed the JIF together with Irving Sher in the 1960s (Garfield & Sher, 1963). Since its introduction, JIF has been widely discussed by Garfield and others (Garfield, 1976, 1994a, 1994b, 1999, 2006; Moed & Van Leeuwen, 1995; Harter & Nisonger, 1997; Glänzel & Moed, 2002; Sombatsompop, Markpin, & Premkamolnetr, 2004). For this reason only a brief overview of all related aspects is given. For a more detailed overview the literature review written by Bensman (2007) provides a good starting point. The JIF can be roughly described as a measure that reflects the average number of times articles in a journal are cited two years after publication. More formally it is defined as follows:

$$JIF_{\text{Year n}} = \frac{\sum \text{Articles Published Year}_{n-1\&2}}{(\sum \text{Citations in Year}_{n} \text{ to Articles published Year}_{n-1\&2})}$$

The JIF is calculated on a yearly basis and is published annually by the ISI as part of the Journal Citation Report (JCR). Even though it is widely accepted as measure of journal quality it has some flaws that make it subject to criticism. Most obvious is the time frame of two years, because this choice favors journals that publish research in fast developing areas, where research results are quickly picked up and reused by colleagues. Disadvantaged are slow moving fields, like philosophy, were citing older research is common. Other important issues are associated with the JIF. One is the bias in the coverage of the journals used by the ISI to calculate the JIF, be-

cause most of the ISI-selected journals are published in English and originate from Northern America and Western Europe. Other commonly raised concerns are that self citations are counted, that JIF does not cover citations from books, that it fluctuates for the same journal from one year to another, that it can be influenced by citation circles and ceremonial citations, and that it cannot be used to undertake cross discipline comparisons. For a more in-depth discussion of these issues see, for example, Nisonger (2004).

Apart from the JIF, there are other citation based measures for LIS journals published annually by the ISI in the section Information Science and Library Science of the Social Science Citation Index (SSCI) in the JCR. These other measures which are not introduced in detail are mentioned briefly here: the immediacy index, and the citation half-life. Whereas the immediacy index is a measure of how quickly articles in a journal are cited, the half-life indicates how many years one has to go back to include half of all cited articles form one journal. Apart from those two, other measures exist which are commonly applied citation based measures used for the comparison of journals. These are, for example, the average number of references per article, and the self-citation rate of journals. The average number of references is sometimes described as indicator of journal quality, as a longer reference list indicates a better familiarity of the authors with the related research (Schlögl & Stock, 2004:1159). Above average reference to a journal's own articles, defined as incest rate, are not necessarily an indicator of low quality, but are interpreted as indicator of a highly specialized journal.

Examples of studies analyzing LIS journals using citation based methods are Nisonger (1995), a publication highlighting the limitations of the JIF for ranking journals. Cline (1982) ranked journals by the number of times they

were cited by the journal *College and Research Libraries*. Bonnevie (2003) and Coleman (2007) both looked at individual journals, the *Journal of Information Science*, and the *Journal of Eduction for Library and Information Science*, respectively. Haiqi (1995) used citation analysis to rank journals of relevance to medical librarianship. Kim (1991) as well as Schlögl & Stock (2004) used a combination of subjective and citation based rankings to assess LIS journals.

3.1.3 Journal Rankings Based on Productivity

Rankings based on productivity are based on the total number of articles published in a journal. Thus, the more contributions published by a journal, the higher its ranking position. The relationship of the number of journals and their productivity was formally described for the first time by Bradford (1934) (see chapter 2.2.3).

Productivity based journal rankings are sometimes based on a specific topic, for example, contributions to research on academic librarianship (Budd, 1991), 'burnout' among librarians in public libraries (Blazek & Parrish, 1992), and Scientometrics (Hood & Wilson, 2001a). Other rankings are based on a specific community, for example, publications of Canadian LIS researchers in journals (Chu & Wolfram, 1991), or a group of journals cited by a specific journal (Saracevic & Perk, 1973). For a more general approach to ranking journals by their productivity for LIS, Pope (1975) analyzes 7,368 references to journal articles in *A Bibliography on Information Science and Technology*. Using this approach he identifies 1011 different periodicals publishing articles of relevance to LIS, whereas, a 'core' of ten periodicals contributed 26% of all articles. Another approach to rank journals by their productivity was used for many of the earlier studies comparing secondary

services on LIS literature (Buntrock, 1964; Gilchrist, 1966; Dansey, 1973; Edwards, 1975). This approach counts the number of times articles from each journal were indexed, and then ranks them by the combined number of entries in all secondary services. Articles indexed more than once by different services were are not analyzed in the above studies.

Generally studies on productivity suffer from the problem that journal publishing more articles have a clear advantage in such rankings. For this reason journals that appear weekly, and journals publishing mainly short articles, like book reviews, will have a tendency to appear higher in such rankings than quarterly publications. This contradicts the importance that some annual reviews with fewer than a dozen articles have for the field, for example, the *Annual Review of Information Science and Technology*. For this reason, Pope (1975) suggested that it may be better to measure the ratio of relevant to irrelevant articles in a journal instead.

3.1.4 Journal Rankings Based on Other Criteria

Apart from the three criteria for journal ranking discussed above, there are other approaches that to not neatly fit into these categories. Such rankings are, for example, based on readability, research and teaching relatedness, the number of requested copies, or the cost-effectiveness of journals.

Richardson (1977) used Flesch's Reading Ease formula to assess the readability of LIS journals. He showed a general trend for journals with higher circulation, like *American Libraries* to have higher readability. A ranking of journals according to their research and teaching relatedness was undertaken by Esteibar & Lancester (1992). They compared the number of times a specific journal was mentioned in 131 course reading lists, 41 doctoral dissertations and 114 faculty publications. Even though their study was influ-

enced by the focus of research and teaching at the University of Illinois, they showed clear differences in journals used for university courses and research. The authors showed that for both, research and teaching, approximately 200 out of the 1,200 journals held by LIS library at Illinois were used. Bobinski (1985) focused on 105 LIS journals from the US, and ranked journals by starting year of their publication, their sponsor or publisher, the publication frequency, and their price. The cost-effectiveness of LIS journals was also the main criteria in a recent article by Via & Schmidle (2007). In this publications the authors ranked 116 journals by the number of times they were mentioned in the bibliographies of eleven 'premier' library journals. They then calculated the number in relation to the subscription cost, thus arriving at a 'cost per citation' for each journal. The number of requested copies of articles from the document delivery service *Subito*[8] was used as ranking criteria in two studies by Schlögl & Gorraiz (2003, 2004). Even though the authors did not focus on LIS journals they showed that the number of requested copies of journal articles can be used successfully for ranking journals by importance. In another study, Schlögl & Petschnig (2005) analyzed the editorial policies of 48 LIS journals. Their study provides insight on the subject orientation, the structure of readership, content and authors, the composition of editorial boards, the peer review process, and the number of rejected submissions for each journal.

3.2 Studies on Overlap in Databases

Summary. The following section gives an overview of research related to overlap between literature reference databases. First a general introduction to research on overlap is be given, followed by a review of previous studies

[8] http:www.subito-doc.de

on overlap of databases in general. Space limitations prevent giving a more general overview here on a wider range of aspects of research on databases; for such an overview see, for example, Jacso (1997).

3.2.1 General Remarks on Overlap

The relevant literature on database overlap uses mainly two different methods to measure the overlap between databases. Both are briefly introduced in this section. Following the introduction of the two general procedures used to gather the data is an explanation of two different methods of calculating the overlap between databases. The traditional way of measuring overlap and the two-way relative overlap are both used in the literature and are discussed in this thesis.

3.2.1.1 Methods of Measuring Overlap

When overlap between databases is measured one always has to ask the question: *What kind of overlap is measured?* Generally two different ways are used to measure the overlap, which are also referred to two levels, the journal level and the article level. In this thesis, databases are compared on the journal level, which means this thesis analyzes what journals are shared by the different databases and counts a journal listed by two sources as an overlap between both sources. Therefore the more journals two databases share the higher their degree of overlap.

Another way of measuring overlap between two databases goes beyond the journal level to the level of individual articles. The idea for looking at individual articles is that looking at the journal level "*... is only a very rough indicator of the overlap since an article in a journal scanned by several secondary sources may not be abstracted by any one of them.*" (Gluck,

1990:44). In other words, the way a journal is indexed by several A&I services could differ. Most services index journal content selectively, which means they include only a fraction of the articles published in a journal. Even if two services include the same journal, it does not necessarily mean that they fully overlap in their coverage of that journal.

Because the main goal of this thesis is to compile a comprehensive list of LIS journals; and a secondary goal is to compare A&I databases which index them, comparing databases on the journal level is acceptable. In addition to this, since research over the last two decades was mainly focused at the article level, researchers have started asking for studies on the journal overlap between different databases to better understand their results when comparing databases on the basis of individual articles. For example, Hood and Wilson state in their conclusion in a paper where they compare the coverage of different topics over databases on the article level that:

> A logical progression of this research is to investigate further the underlying mechanisms for the types of literature scatter so as to answer suggested questions, such as: "To what degree is the overlap caused by overlap in the indexing of the same journals in different databases?" (Hood & Wilson, 2001b:1254)

In this sense a comparison of LIS related literature database on the current journal level may be the foundation on which to build further comparison of the databases at the article level.

3.2.1.2 The Traditional Measure of Overlap

In 1990 Gluck reviewed the literature from 30 years on measuring the coverage overlap between databases. He states that:

> Journal coverage overlap has traditionally been defined as the ratio of the number of journal titles or articles in the intersection of two secondary sources to the number in their union. (Gluck, 1990:43)

Furthermore most of the studies he reviewed use the same way for calculating the degree of overlap between databases. The formula which is given by him and others, for example, by LaBorie, et al. (1985) is the following:

$$\%\ Overlap_{traditional} = \left(\frac{C}{((A+B)-C)}\right) \times 100$$

where

C : the number of common journals,
A : the number of journals in database A,
B : the number of journals in database B.

Gluck calls this method for calculating the overlap between two databases the traditional overlap, a denomination that is also adopted in this thesis. However, using this formula to calculate the degree of overlap between two databases has the limitation that it neglects the relative size of secondary sources to each other. For this reason the degree of overlap is unchanged when one partner is much smaller than the other, as long as the number of total items and the items that overlap stay the same. The concept of calculating a two-way overlap for databases can overcome this limitation.

3.2.1.3 Two-way Relative Overlap

To overcome the limitation of the traditional overlap neglecting the relative sizes of databases, the two-way overlap approach looks at the overlap between two sources from the perspective of ether of these sources. The important idea on the two-way relative overlap measurement is that the overlap between *A and B* is not necessarily the overlap between *B and A*. The following example based on common knowledge, will illustrate this. Looking at the shared border between a large country like Germany and a small country like Luxembourg shows that overlap between A and B is not the same as the overlap between B and A. When looking at the border between

both countries from the perspective of Luxembourg, Luxembourg shares a large proportion of its border with Germany. However, switching the perspective and looking at the same strip of border between both countries, the border with Luxembourg is just a small fraction of the German border. As this example illustrates the perception of overlap can differ depending on the perspective that is taken. As the calculation of the traditional overlap fails to take this perspective, another way of calculating the overlap between two sources was introduced by Bearman & Kunberger (1977) when they investigated the overlap between fourteen different databases for the National Federation of Abstracting and Indexing Services (NFAIS). They introduced the two-way overlap approach which calculates two values for the overlap between two sources, reflecting the overlap from the perspective of either of the sources:

$$\%\ Overlap\ \text{in}\ A_{two-way} = \left(\frac{C}{A}\right) \times 100$$

$$\%\ Overlap\ \text{in}\ B_{two-way} = \left(\frac{C}{B}\right) \times 100$$

where

C : the number of common journals,
A : the number of journals in database A,
B : the number of journals in database B.

The values calculated using the two-way relative overlap approach are usually displayed in a matrix similar to that used when displaying the results for the traditional overlap. However, in this case the upper and the lower half from the diagonal of the matrix are not identical but show the values from either of the database's perspectives. A recent study using this approach is Hood & Wilson (2003b).

3.2.2 Overlap in Literature Reference Databases

As stated above, there are two distinguishable levels of research on databases covering references to literature, the journal level and the article level. Over the last two decades most of the research was focused on the article level, with the most studies analyzing how the literature for a specific subject is distributed among or overlaps between different databases. Studies of this kind have been undertaken for almost any academic field and discipline.[9] For a more comprehensive list of studies for various disciplines see Walters & Wilder (2003), Jacso (1997) and the bibliography given by Gluck (1990).

The following studies went beyond the point of simply comparing the coverage and overlap of a subjects literature in different databases, by discussing the topic on a more general level. For example, Hood & Wilson (1999) discuss the methodological implications for different possible counting methods for duplicate records, showing that depending on the counting method used different results can emerge from the same data. Another interesting angle on the coverage of the literature of different topics is given by Hood & Wilson (2001b). Comparing the distribution of literature over databases for fourteen different topics, they showed that the number of databases needed for a certain coverage, is topic dependent. For example, if a searcher'starget

[9]For example, Medicine (Brand de Heer, 2000; Suarez-Almazor, Belseck, Homik, Dorgan, & Ramos-Remus, 2000), Biomedicine (Mychko-Megrin, 1991), Forensic Medicine (Yonker, Penny Young, Horwitz, & Cousin, 1990), Architecture (Giral & Taylor, 1993), Women studies (Gerhard, Jacobson, & Williamson, 1993), Biology (Lascar & Mendelsohn, 2002), Pesticides (Meyer, Mehlman, Reeves, Origoni, Evans, & Sellers, 1983), Current Events (Jaguszewski & Kempf, 1995), IT (Marcus, 1995), Engineering (Salisbury & Noguera, 2002), Emergency Management (Tenopir, 1982), Psychiatry (McDonald, Taylor, & Adams, 1999), History (Tellman, 2001), Fuzzy Set Theory (Hood, 1998), Marine Science (Parker, 2005) and English Literature (Stebelman, 2000).

is to cover 90% of all available literature, depending on the topic between eight to 26 databases have to be searched.

Pao (1993) unraveled the question of importance of overlapping articles. She could show, that articles that were indexed by both Medline® and SCI® were more likely to be relevant than articles that were indexed by one of the services. Her research suggests that overlap in databases could be used as a ranking criterion to identify the more relevant literature. A recent study on the journal level was provided by Chen (2006) who compared the titles of journals which overlapped in four large scale multidisciplinary literature reference databases, and three more specialized indexes. Chen's work is of interest here, because the method used by Chen is similar to the one applied in this thesis. A list of indexed journals was downloaded from different vendors and then their overlap estimated by matching up ISSN numbers. However, Chen did not try to overcome the methodical problems related to those journal lists, which is described in detail in Chapter 4.2.

3.3 Studies on Secondary Sources for LIS

Summary. This section will give an overview of research related to secondary sources used for searching the literature for LIS. In contrast to the previous section, it is not exclusively about overlap, but encompasses all kinds of studies related to secondary sources used for literature research in LIS.

3.3.1 Overview

This section looks at previous research related to secondary sources for literature research in LIS. In all of the studies published over the last two dec-

ades, the secondary sources were all literature reference databases. For earlier studies in the 1960s and 1970s, secondary sources included also printed abstracting and indexing (A&I) publications. The term secondary sources is used here to make clear that both electronic databases and printed publications are encompassed.

Table 3.1: Overview of Secondary Services Indexing LIS Literature

	Full Name	Comments
LISA	Library and Information Science Abstracts	Before 1969 called: Library Science Abstracts (LSA)
LLIS	Library Literature and Information Science	Before 2000 called: Library Literature (LL)
LISTA	Library, Information Science Technology Abstracts	
ISTA	Information Science Technology Abstracts	Before 2002 called: Information Science Abstracts (ISA)
SSCI	Social Science Citation Index – Subsection Information Science and Library Science	
PASCAL	Bulletin Signalétique – Section 101 Science de l'Information Documentation (BS)	BS is now part of the Pascal system
RZI	Referativnyi Zhurnal – Section 59 Informatika	
INSPEC	INSPEC – Subsection Computer and Control Abstracts (CCA)	Section 72 Information Science and Documentation
ERIC	Educational Resources Information Centre	

To avoid confusion due to differing titles and name changes among secondary sources since 1964, the year of the earliest study presented in this literature review. Table 3.1 gives a brief overview of the commonly used abbreviations, the full names and previous names of the secondary sources used in

most studies. All sources which are also used for analysis in this thesis are introduced in more detail in Chapter 4.1. For the sake of consistency only the current name of each service will be used in this thesis, even if referring to a older study when the service was known under a different name. This approach is taken to make clear the comparisons of the same secondary sources over time.

Table 3.2: Overview of the Secondary Sources Included in Studies from 1964 to 2007

	No. of data-bases incl.	LISA	LLIS	ISTA	SSCI	BSI (Pascal)	RZI	CCA (Inspec)	ERIC	Further secondary sources included
Buntrock (1964)	9	X				X				JASIST; A. u. Ziff.; Dok.; J. Doc.; Lit. on Atm.; IWP ; Rev. Int. Doc.
Gilchrist (1966)	6	X	X				X			JASIST; IWP; Rev. Int. Doc.
Dansey (1973)	5	X		X		X	X	X		
Goldstein (1973)	5	X	X	X			X			Current Awareness Lib. Lit.
Edwards (1975)	6	X	X	X		X	X	X		
Hawkins & Miller (1977)	8				X			X	X	CA; Medl.; Bio.; CAIN; EI
LaBorie & Halperin (1981)	2	X							X	
Bottle & Efthimiadis (1984)	5	X		X		X	X	X		
LaBorie et al. (1985)	10	X	X	X	X		X	X	X	Hist. Abs.; Chem. Abs.; ABI
Stieg & Atkinson (1988)	3	X	X						X	
Ernest et al. (1988)	3	X	X						X	
Nicholls (1989)	4	X	X	X					X	
Yerkey & Glogowski (1989, 1990)	55				X			X	X	Diss. Abs.; Monthly Cat.; NTIS ; CAIN; Biling. Edu.; ...
Hood & Wilson (1994)	1	X								
Jasco (1994)	7	X	X	X						ABI; Wil. Bus. Abs.; Mngmt Cont.; Econ. Lit. Index
Jacso (1998)	6	X	X	X	X	X		X		
Read & Smith (2000)	3	X	X	X						
Boese (2000)	6	X	X						X	UnCov.; NL; Wil. Edu. Ab.
Meho & Spurgin (2005)	9	X	X	X	X	X		X	X	World Cat; Ins. Conf.
Jacso (2007)	7	X	X	X	X					LISTA; Gale LIS

For a brief overview of the studies reviewed in this section and the secondary sources involved, Table 3.2 gives a list of all studies reviewed with the secondary sources considered in each of them. As can be seen LISA was analyzed in almost all studies, followed by LLIS and ISTA which were considered in more than half of all studies. The Russian RZI has not been involved in any review since the mid eighties, suggesting a decreasing interest in this source by researchers.

The following literature review is split in three sections. Section one is related to studies on the comprehensiveness of secondary services; section two deals with studies analyzing the coverage of the services; and section three deals with further research aspects discussed in the literature. Section one and two on the comprehensiveness and the coverage of secondary services are closely related to each other. In praxis both areas overlap c, as the question is usually: How comprehensive is the coverage of a specific topic in secondary sources? However, two slightly different phenomena are described and it makes sense to distinguish them in this literature review. Comprehensiveness is related to the question of *how completely* is the literature covered, whereas coverage is related to the question *what* literature is covered.

3.3.2 Comprehensiveness of Secondary Sources

The question of comprehensiveness is related to the question of: *How completely is a specific body of literature indexed by secondary services?*

3.3.2.1 Bibliographic Comprehensiveness Approaches

An early approach to test the comprehensiveness of different secondary services was was introduced by Martyn & Slater (1964) and adopted to invest-

igate LIS sources by Gilchrist (1966), Dansey (1973), and Edwards, 1975. The Martyn & Slater approach makes use of a comprehensive bibliography of a subject as a starting point. All items in this bibliography are then checked for existence in the different secondary sources the results of which are then compared. The idea is: the higher the number of references from the bibliography included in the secondary sources, the better is the comprehensiveness of the secondary source on that topic. However, this approach has some downsides. One is that the bibliographies are usually in English, which leads to bias towards English publications and neglect of important publications in other languages. Another problem of this approach is that secondary sources are usually involved in the process of compiling a bibliography and that the way of assessing the completeness of secondary sources is to some extent circular: a product compiled using secondary sources is used to compare secondary sources. A comparison of secondary sources using this approach will always favor the secondary sources used during the process of compiling the bibliography.

3.3.2.2 Approaches of Topic Searches

Later attempts to analyze the comprehensiveness used topic searches in electronic databases instead. Studies of this kind usually searched the literature on more than one topic. However, studies which search more than one also compare the coverage of different topics in databases. Thus, the demarcation line between studies on comprehensiveness and coverage is fuzzy when topic searches are used. The following section focuses on studies using topic searches where comprehensiveness of secondary sources was the main interest. An early study using this method to estimate comprehensiveness was, for example, Hawkins & Miller (1977). Using topic searches, they

compared the number of retrieved records when searching different databases. Comprehensiveness is then estimated by analyzing the number of records retrieved from each database in comparison to the total number of unique documents found combining the results from all databases. The higher the share on all unique documents retrieved, the higher the comprehensiveness of the database has on a topic. Yerkey & Glogowski (1989) searched 55 non-LIS databases to estimate the comprehensiveness of different LIS topics in non-LIS databases. Their results indicated that a lot of references of relevance to LIS are included in other databases and that LIS specific databases are not comprehensive in indexing all the literature of interest to LIS. Yerkes & Glogowski (1989) showed LISA indexed only 25% of all the references found when searching other databases.

3.3.2.3 Total Comprehensiveness Approaches

A general problem with all studies using topic searches discussed so far is that they limit their definition of comprehensiveness to the body of literature referenced in the databases searched. They all leave out the question of how comprehensive is the literature referenced in databases in relation to all literature available. This question has been investigated by Wilson (1999b) in an approach combining topic searches with the earlier bibliographic coverage attempt. Wilson used her own comprehensive collection of literature related to Bradford's Law as a basis for measuring comprehensiveness when searching this topic in a wide range of literature reference databases. Her results are sobering; even when using strict criteria limiting her collection to the most central documents and combining all databases, just 61% of all documents are found. However, it could be the case that this

weak recall performance is due to bad indexing quality rather than non-existing indexing of the relevant documents.

Another interesting approach in assessing the comprehensiveness of secondary services came from Meho & Spurgin (2005). Again this approach used a comprehensive bibliography as base line to estimate the recall performance of different databases indexing LIS relevant literature. New in this study was the way the authors compiled their bibliography. Instead of focusing on a specific topic, the authors used complete publication lists of 68 researchers working in eighteen different LIS departments. They found that comprehensiveness was best for journal articles, but even when all nine databases were combined comprehensiveness only reached 84.1%. The database with the best performance was LLIS, which was shown as slightly more than half of all articles (50.7%). When classifying the list of all publications into different topics and looking at the comprehensiveness for each topic Meho & Spurgin (2005) could show clear differences between databases and topics, indicating different levels of *coverage* for topics by different databases.

In conclusion one can say that all studies indicate that for comprehensive searches more than one secondary source need to be searched (Gilchrist, 1966; Hawkins & Miller, 1977; Yerkey & Glogowski, 1989), and that even a extended number of sources will not provide a totally comprehensive list of references (Wilson, 1999b; Meho & Spurgin, 2005). Studies also indicate that the number of databases required for a specific level of comprehensiveness is highly topic dependent (Hood & Wilson, 2001b; Meho & Spurgin, 2005).

3.3.3 Coverage of Secondary Sources

Coverage of secondary services is related to the question of: *How well is a specific body of literature covered by secondary services?*

3.3.3.1 Coverage at the Journal Level

Early approaches of comparing the coverage of secondary sources all focussed on the journal level. Studies of this kind have been done mostly with printed sources of references, before the advent of electronic bibliographic databases (Buntrock, 1964; Gilchrist, 1966; Dansey, 1973; Goldstein, 1973; Edwards, 1975). For their comparisons, these authors counted the number of references to journals appearing in the different sources, thus compiling a list of journals indexed by each service with the number of times each journal is mentioned. To compare the overlap of the coverage of the different sources with each other the journals appearing in the list of indexed journals are then compared with each other. If a journal was indexed by two of the sources, it is counted as overlap. The total number of journals in common between two sources then is said to reflect the degree of coverage overlap between both sources. Studies of this kind face the problem that they look only at the journal titles and not at individual articles. Under these conditions, it might be the case that a journal is counted as coverage overlap between two sources even though both sources have indexed different articles in this journal and therefore no real overlap occurred. However, the number of common journals defines an upper boundary of the potential overlap between two sources and is therefore a good indicator to what degree two sources *can* overlap. Even though Jacso (1997:241) claims that "*the majority of studies compare overlap of journal titles between A&I services,*" there was no study of this kind for secondary sources for LIS literat-

ure published after the mid 1980s (Bottle & Efthimiadis, 1984; LaBorie, et al. (1985).[10]

3.3.3.2 Coverage at the Topic Level

After electronic databases became more common, the methodology used for the comparison of the coverage in secondary sources shifted from the journal level to the article level. One approach that emerged together with the databases was the use of topic specific searches to assess the coverage of different topics in secondary sources (LaBorie & Halperin, 1981; Nicholls, 1989; Read & Smith, 2000; Boese, 2000). This approach compares the coverage of a specific topic in different secondary sources. Usually studies using this approach used different search strategies for more than one topic and then compared the number of retrieved records for each topic from each database. The more relevant records that could be retrieved from one database, the higher the coverage for this topic in the database.

A common finding from all studies, where more than one topic was searched, is that the coverage of different topics changes from database to database, meaning that the best database or the optimal database combination is highly topic dependent (Meho & Spurgin, 2005). Yerkey & Glogowski (1990) also showed that when literature related to LIS topics is searched in non-LIS related literature reference databases, the non-LIS databases can be divided into different groups, some being more fruitful when searching specific LIS topics.

[10]At least no study that reached a wider audience or one that was mentioned in any major literature review.

3.3.3.3 Coverage of Internationality and Languages

Another aspect is the internationality and coverage of different languages in databases. Edwards (1975) made an early attempt to look at the different languages covered by secondary sources, and Bottle & Efthimiadis (1984) looked at the languages as well as the countries of publication for journals indexed by different databases. In relation to countries, there was a clear favor towards the country the secondary service came from and generally towards North American and Western European publications. Both studies also showed a clear bias towards material published in English rather than other languages, with LISA being the source covering the most international material. However, as Hernon & Metoyer-Duran (1992) state, there is a downside to good international coverage, because researchers sometimes retrieved references to literature which is sometimes hard to get or in a language they do not understand.

3.3.4 Other Aspects

Apart from comprehensiveness and coverage of secondary sources on LIS literature, other aspects have been investigated as well. Other aspects in the focus of interest have been, for example, the indexing quality, the currency and the size of secondary sources.

3.3.4.1 Indexing Quality

Indexing quality is of interest in studies on LIS databases as it determines if relevant literature can be found easily in the database or not. If some aspects of the content of an article have not been addressed in the descriptors or identifiers assigned to an article, that article may not be found. The same happens if articles are indexed inconsistently using different vocabulary or

terms for identical concepts, or if the content of an article is described insufficiently in the abstract. This issue was directly addressed for LIS related databases by Stieg & Atkinson (1988) and Hood & Wilson (1994). The later study analyzed the distribution of indexing terms over documents in LISA, finding that some terms were scarcely used and that there was plenty of room for improvement for LISA's thesaurus. The approach of the earlier study was quite different; it used a list of publications from faculty staff from different universities and searched for their publications in LISA, LLIS and ERIC. Stieg & Atkinson (1988) then sent the list of all descriptors assigned to each publication to the original authors and asked them if the descriptors used had sufficiently described their article. The main finding was that authors found that the terms used by the indexers were too general and lacked specificity.

3.3.4.2 Currency and Time Lag

Studies on currency and time lag show an erratic pattern for the different databases. A database that used to have good timeliness in one study can be among the lower end in an other study. The currency and time lag of secondary services has been of interest already in early studies (Gilchrist, 1966; Dansey, 1973; Edwards, 1975). However, the first study that discussed the time lag in electronic databases of relevance to LIS in detail was Bottle & Efthimiadis (1984), who looked at the differences in five databases. A study by Ernest, Lange, & Herring (1988) looks even more closely at the question of how quickly references are added to databases after a journal has been published. In this study, the authors tracked updates to three databases over a 15 months period to ascertain that the time between publication of a journal and indexing of its contents by a service varies from

roughly four to ten months. Jacso (1998) was more interested in ISTA closely analyzing the timeliness and coverage of 42 different journals by that service over time.

3.3.4.3 Size

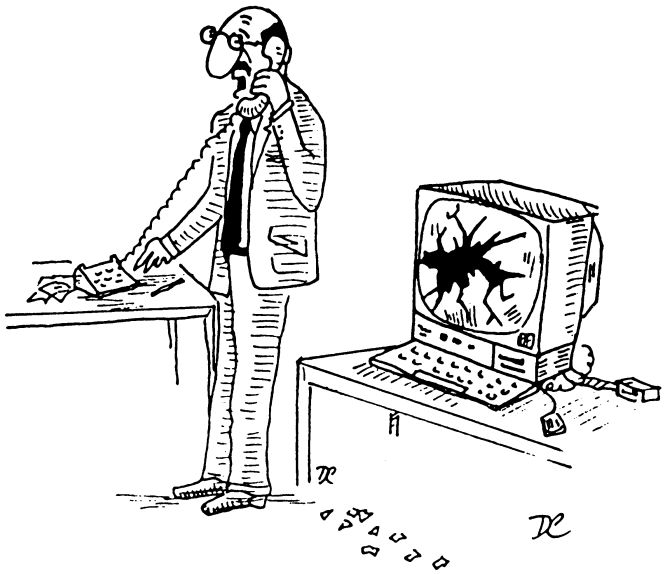
Usually the size of databases is described by the number of records they contain. As this measurement can lead to wrong conclusions, Jacso (1994) has taken a different approach. His approach puts the number of records in a database in relation to the age of the database and the number of journals indexed, a method which makes databases of different age and different scope more comparable to each other. In a recent paper Jacso (2007) discusses different definitions of size, like number of records with abstracts, full-text coverage, and details on cited references. He applies these different criteria to a range of databases relevant for literature research in LIS concluding that in all aspects LISTA is the biggest database in size, except when looking at the number of records enriched with information on cited references. In this case SSCI has the lead.

In conclusion the following quote, highlights the importance of comprehensive coverage over other factors:

> ...low coverage makes nonsense of the notion of high recall. What does it profit a reader to obtain 90 percent of the articles on library funding patterns in some mythical database when the database includes only ten percent of the articles on library funding that have been written? (Stieg & Atkinson, 1988:48)

All the studies examined for this review conclude that a database that does not cover the central journals of LIS sufficiently will be of inferior quality even if journals are indexed comprehensively, with high quality and little time lag.

4 Methodology



Bundy & Matthews, 1993

4.1 The Databases

Summary. This comparative study uses designated LIS journals from ten different secondary sources. In the following section all ten secondary sources will be introduced briefly, and reasons for inclusion will be given. The ten sources used are listed in Table 4.1. They can be divided into the following categories: one is a listing of electronic journals (EZB); six are LIS subject specific databases (INFODATA, Current Contents, LISA, LLIS, LISTA, and ISTA) and three are large scale multi-disciplinary databases (ASAP, ASP, SSCI). From the EZB and the three multi-disciplinary databases just the subset of LIS related journals, as classified by the database producer, was analyzed.

Table 4.1: Title, Abbreviation and Type of the Journal Lists

Title	Abbreviation	Type
Elektronische Zeitschriften Bibliothek	EZB	Listing
Infodata	INFODATA	LIS
Current Contents (by IZ Potsdam)	CC	LIS
Library and Information Science Abstracts	LISA	LIS
Library Literature and Information Science	LLIS	LIS
Library, Information Science and Technology Abstracts	LISTA	LIS
Information Science and Technology Abstracts	ISTA	LIS
Expanded Academic ASAP	ASAP	Multi-dis.
Academic Search Premier	ASP	Multi-dis.
SSCI – Information Science and Library Science	SSCI-ISLS	Multi-dis.

LIS: Library and Information Science related literature reference database.
Listing: Library and Information Science related journal listing.
Multi-dis: Multi-disciplinary literature reference database.

4.1.1 Elektronische Zeitschriften Bibliothek (EZB)

EZB stands for *Elektronische Zeitschriften Bibliothek* and in English, 'Electronic Journals Library'. The EZB is a platform developed by the libraries of the University of Regensburg and the Technical University of Munich. It is currently shared among 408 libraries and research institutes in Germany and Europe to manage their access to electronic journals by maintaining a list of all electronic journals held globally. Currently the listing contains more than 31,300 titles, of which 14,123 are freely accessable.[11] The lion's share are non-freely available professional journals (like *Science* or *Nature*), which need online subscriptions by the participating institution or library in order to provide access to the content of the journal. As the EZB is the most comprehensive specialized list of electronic journals worldwide (Geißelmann & Junger, 2007) and because of its coverage of Open Access journals, EZB's index of LIS journals was included. The complete list of 556

[11]Actual figures and a list of the participating institutions can be found at: Informationen zur Elektronischen Zeitschriftenbibliothek ►http://rzblx1.uni-regensburg.de/ezeit/about.phtml

LIS journals was sent to me by Cornelia Vinzent, the contact person for the EZB at the Saarland University on 16 March 2007, reflecting the state of the EZB on that day 10 am German time. However, as the list contained more than one entry for some journals the list was shortened to 525 unique titles. The reason for multiple listings of journals were due to different electronic names for accessing older and newer volumes, - for example, *Zeitschrift für Bibliothekswesen und Bibliographie (ZfBB)* and *Libri (International Journal of Libraries and Information Services);* or spelling and case differences, - for example, *AABADOM/Aabadom*. It is important to point out, that EZB is unique in this study, in so far as it is the only source not actively indexing the content of the journals listed. That is, it is a serials database and not a bibliographic records database.

4.1.2 INFODATA

INFODATA is included because it is the most comprehensive database produced in Germany on LIS literature. It is bilingual, having a German and English thesaurus and classification. The producer is the *Informationszentrum für Informationswissenschaft und -praxis der Fachhochschule Potsdam.*[12] Currently the database is accessable via three different hosts: STN (Fachinformationszentrum-Karlsruhe), FIZ-Technik (Fachinformationszentrum-Technik) and GBI-Genios.[13] There is also a direct access to the data-

[12]Homepage: ►http://forge.fh-potsdam.de/~BiB/neu/iz/1/iz_home.htm

[13]Description of INFODATA from STN:
►http://www.stn-international.de/stndatabases/databases/infodata.html and
►http://www.cas.org/ASSETS/CC904F2DE6B8442ABF97ED51187F3565/infodata.pdf

Description of INFODATA from FIZ-Technik: ►http://www.fiz-technik.de/db/b_idat.htm

Description of INFODATA from GBI-Genios: ►http://www.gbi.de/r_profisuche/INFO.htx?START=AE0&WID=16522-5750487-00604_3

base provided by the Informationszentrum itself.[14] INFODATA was started in 1976, but some of its bibliographic records date further back. The database is updated monthly and contained 102,355 records in April 2007. According to the file producer, 65% of the content is in English, 30% in German and 5% in other languages. There are different statements about the number of journals indexed for INFODATA. The highest number of 356 journals is given by FIZ-Technik, linking as reference to the list of journals held by the *Hochschulbibliothek Potsdam*, the second highest number of 240 journal is given on the Informationszentrum's own access page to INFODATA.[15] Considering these different statements on the journal coverage, the Informationszentrum was contacted directly in order to obtain a list of currently tracked journals for the database. This list was sent to me on 21 March 2007 by Elke Stelle, an employee of the Informationszentrum and contained only 108 journals. This difference indicates a necessary update on the databases homepage.

4.1.3 Current Contents, by IZ Potsdam (CC)

Current Contents is produced by the *Informationszentrum (IZ) für Informationswissenschaft und -praxis der Fachhochschule Potsdam*, the same producer providing INFODATA (see above). Current Contents provides access to the table of contents of 23 LIS journals in order to make the scientific community aware of the latest research in the area.[16] It is divided into the two areas *New Media* and *Information Management*. Current Contents also

[14]The access to INFODATA by the Informationszentrum can be found at: ►http://fabdq.fh-potsdam.de/infodata/

[15]"*Grundlage sind ca. 240 Periodika*" ►http://fabdq.fh-potsdam.de/infodata/

[16]The title list of journals used for Current Contents was obtained from: ►http://forge.fh-potsdam.de/~BiB/neu/iz/CC/aktuell/ccgesamt.htm

has an archive dating back to 1998 that can be searched free of charge. However, retrieval options are limited as there is only brief information about an individual paper (author, title and journal name). Current Contents was included as it is the only service of this kind for LIS research in Germany and because the inclusion of a particular journal in Current Contents makes a statement about the importance given to the journal by the IZ.

4.1.4 Library and Information Science Abstracts (LISA)

Library and Information Science Literature (LISA) is a large literature reference database in English. According to the producer, LISA covers LIS related literature from 68 countries in more than 30 languages (CSA, 2006). LISA was started in 1969 and had more than 297,000 records in May 2007, indexing 413 journals, fourteen from Germany (CSA, 2007).[17] For many years the database was produced by the publisher Bowker-Saur which became part of Reed Business Information in 1998 (Reed, 1998). However, LISA is now maintained by CSA which is part of ProQuest. LISA was included because it is a comprehensive database of LIS literature, and because it was used in several previous studies on LIS related databases, for example, Read & Smith (2000), LaBorie & Halperin (1981), LaBorie et al. (1985), Ernest et al. (1988), Nicholls (1989) and Hood & Wilson (1994).

4.1.5 Library Literature and Information Science (LLIS)

Library Literature and Information Science (LLIS) is a comprehensive database on LIS related literature, produced by H.W. Wilson. In May 2007 the

[17]The title list of journals indexed for LISA was obtained from CSA and can be found at: ►http://www.csa.com/factsheets/supplements/lisa.php

database had more than 304,000 records which, according to the producer, date as far back as 1984.[18] It is hosted by Dialog® under the file number 438 and updated monthly (Dialog, 2006). Library Literature and Information Science indexes 404 journals. The database was included because of its size and coverage of LIS related literature as well as its use in studies on LIS related databases before, for example Read & Smith, 2000.

4.1.6 Library, Information Science and Technology Abstracts (LISTA)

Library, Information Science and Technology Abstracts is the third large LIS related database in English. LISTA is produced by EBSCO and covers 604 periodicals which are categorized into academic journals, magazines and trade publications.[19] According to the producer the records go back to the mid-1960s (Ebsco, n.d.-a). However a look at the title list shows that just a handful of journals were indexed before the 1980s. In May 2007 a search revealed that the database has just over 1,000,000 records, thus making it in (terms of records) the biggest database of the ones under review. LISTA was included for its size and also because EBSCO is making it available free of charge.[20]

4.1.7 Information Science and Technology Abstracts (ISTA)

ISTA is the second Information Science related database provided by EBSCO. However, it has a slightly different focus than LISTA, and includes

[18]A search revealed that the database also contains 2,959 records from before 1984. However, the are mostly from 1983 and no records were before 1979.

[19]The title list of journals indexed for LISTA can be found at: ►http://www.epnet.com/thisTopic.php?marketID=1&topicID=513

[20]LISTA can be accessed free of charge at: ►http://www.libraryresearch.com/

Search Engines and *Scholarly Communication* as covered subjects (Ebsco, n.d.-b). ISTA also only indexes journals and conference proceedings; currently 197 journals are indexed.[21] Information Science and Technology Abstracts was formerly called *Information Science Abstracts (ISA)*, but was renamed in 2003 (EContentmag, 2003), and later that year it was sold by Information Today Inc. to EBSCO (Infotoday, 2003). The database was included because of its subject coverage and it uses in previous studies, for example, Read & Smith, 2000, LaBorie et al. 1985 and Nicholls, 1989.

4.1.8 Expanded Academic ASAP

Expanded Academic ASAP is a comprehensive database covering a wide range of academic disciplines. The database indexes the content of around 3,800 academic journals - 2,500 are peer reviewed (Thomson Gale, n.d.), thus providing a large body of academic publications from a wide range of subjects. The inclusion of journals in a comprehensive source lends importance to publications by the database producer. Seventy-four journals that were listed either explicitly as LIS or under related subject categories were included.[22] Related categories containing few entries included the following: special libraries, school and children's libraries, reference and research service, library technical services, library automation and technology, academic libraries, library management and finance, information systems management, information management, end user applications, and databases.

[21]The title list of journals indexed for ISTA can be found at: ►http://www.epnet.com/thisTopic.php?marketID=1&topicID=91

[22]The title list of journals indexed for Expanded Academic ASAP can be found at: ►http://www.gale.com/tlist/sb5019.xls

4.1.9 Academic Search Premier (ASP)

The second comprehensive database used in the journal set is Academic Search Premier, a multi-discipline file provided by EBSCO. ASP indexes more than 8,100 academic journals, and nearly 7,000 are peer reviewed (Ebsco, n.d.-c). In terms of the number of indexed journals it is the most comprehensive database included - about twice the size of Tompson's multi discipline database ASAP (see above). Under the subject category 'Library and Information Sciences' 120 journals were listed and included in this study.[23] Inclusion of journals in this comprehensive source shows the importance given to specific publications by the database producer.

4.1.10 SSCI – Information Science and Library Science

The Social Science Citation Index (SSCI) started in 1973. Like the Science Citation Index (SCI), it was unique insofar as it was the first source in the field of the social sciences that allowed the retrieval of cited references. This means SSCI can be used to find out which articles have been cited by another article.[24] Currently 2,003 journals are included in the SSCI. The list of journals under the subject category Information Science and Library Science from the Social Science Citation Index (SSCI) was included in the study, firstly, because inclusion in the SSCI is very prestigious for a journal, and secondly, in order to provide a basis for comparison of the journals listed in SSCI with these from the other databases. Currently, Thomson Scientific lists 61 journals in this category.[25] However, one 'journal' is a mono-

[23]The title list of LIS journals indexed for SSCI can be found at: ►http://www.epnet.com/thisTopic.php?marketID=1&topicID=1

[24] For more information on citation based retrieval methods provided by SSCI see, for example, Bensman (2007).

graphie series and was removed from the list, thus leaving 60 LIS related journals currently indexed for SSCI.[26]

4.2 Methodical Problems

Summary. In a paper by Hood & Wilson (2003a) concerned with methodical problems when working with databases, the authors state that:

> Over time, a journal may change its name, split into two journals, two journals may merge, and the publisher or country of origin may change. The frequency of issue may change, special issues may be produced or an issue may not be produced. The cover date may differ from the actual date of production. Two journals may have the same or very similar names ...
> (Hood & Wilson, 2003a:595)

Event though not all of the problems above apply directly to this study, this statement makes clear that there are several problems when combining information on journals from different sources. These problems can be divided into two major groups: those related to the editorial policy and those related to technical shortcomings. Problems that fall into the first category are: journal name changes, splitting of journals, combining of journals, suspension of journals, the termination of journals, different journals with identical titles and different language titles. Problems that fall into the second category relating to technical shortcomings are: spelling errors, discrepancies in the spelling of titles, wrong ISSN, missing ISSN, change of ISSN and different ISSN for the electronic and print format. Sometimes these problems are related; for example, name changes often go hand-in-hand with the change of ISSN numbers.

[25]SSCI was set up by the Institute for Scientific Information (ISI), which is now part of Thomson Scientific.

[26]The title list of LIS journals indexed for SSCI can be found at: ►http://sunweb.isinet.com/cgi-bin/jrnlst/jlresults.cgi?PC=J&SC=NU

4.2.1 Problems Related to Editorial Policies

Concerning problems falling under the first category, Bensman (2007) notes that: "*... journals, ... have a tendency to change titles, continue or supersede each other, and divide into parts that subsequently do or do not recombine.*" This is a major issue when compiling a list of journals as the same journal may be listed two or more times by the Indexing and Abstracting service under different names, either in error or in order to inflate the given number of journals indexed.

4.2.1.1 Journal Name Changes

Name changes usually show the adjustment of a journal's editorial policy and coverage to a changing environment. Therefore, some journals in the set changed their names more than twice. For example: *CD-ROM Professional* in 1997 became *EMedia Professional,* which then changed to *EMedia Magazine* in 1999, and in 2000 changed its name to *Emedia: The Digital Studio Magazine*. Name changes often, but not necessarily, go hand in hand with changes in ISSN numbers. This sometimes makes it hard to track entries of journals which are no longer published but continue under a new name, as they are falsely counted as two different journals. For example: In 1991 the *Journal of Librarianship* (ISSN 0022-2232) became the *Journal of Librarianship and Information Science* (pISSN 0961-0006 and eISSN 1741-6477), or in 2001 the Journal of the American Society for Information Science (pISSN 0002-8231 and eISSN 1097-4571) became the Journal of the American Society for Information Science and Technology (pISSN 1532-2882 eISSN 1532-2890). On the other hand, name changes without the change of ISSN numbers also occur, though less commonly. For ex-

ample, in 1991 *Buch und Bibliothek* became *BuB-Journal : Forum Bibliothek und Information*; however the ISSN number has remained the same.

4.2.1.2 Splitting of Journals

Journal splitting can indicate that the audience of a journal has developed different interests or that the subject area the journal was focusing on initially has evolved further. One example of a journal that has split is *Nachrichten VSB/SVD* (ISSN 0042-3807) which in 1986 split into *Arbido-A* (ISSN 0258-0772) and *Arbido-B* (ISSN 0258-0764). However, ten years later in 1995 both recombined again to *Arabido* (ISSN 1420-102X).

4.2.1.3 Combining of Journals

Combining of journals refers to the fact that previously independently published journals are published together. If the newly formed journal carries a new name the process is called a merger. When the newly formed publication keeps the name of one of the previously independent journals, the process is called absorption or incorporation. Mergers as well as incorporations/absorptions can both occur, whereas the latter is more common for the journals under review. An example for a merger is *Library Media Connection* (ISSN 1542-4715) which was formed in 2003 as successor of *Book Report* (ISSN 0731-4388) and *Library Talk* (ISSN 1043-237X). Two examples of incorporations/absorptions are *The New Review of Information Networking* (pISSN 1361-4576; eISSN 1740-7869) which in 2007 incorporated *New Review of Information and Library Research* (pISSN 1361-455x; eISSN 1740-7850) or the well known *Information Processing & Management* (ISSN 0306-4573) which in 1984 absorbed the journal *Information Technology: Research and Development* (ISSN 0144-817X).

4.2.1.4 Suspension of Journals

When journals are suspended, their publications are put on hold for some time and then resumed at a later point. This happened, for example, with the *Judaica Librarianship* (ISSN 0739-5086) which was suspended in 2003 and later reinstated in 2006, or the *Alabama Librarian* (ISSN 0002-4295) which was not published between 1998 and 2000.

4.2.1.5 Termination of Journals

One example of a terminated journal is the *Journal of Youth Services in Libraries* (ISSN 0894-2498); it used to be indexed by LISTA and LLIS but ceased publication in 2002. Other examples are two journals which both used to be indexed by LLIS: the *Iowa Library Quarterly* (ISSN 0021-0579) ceased in 1989 and the *Indiana Media Journal* (ISSN 0164-7660) ceased in 1998. The reason for including these journals by the file producers might be that they want to inflate their list of indexed journals. However, it seems doubtful whether to include journals in the list of indexed journals that have not existed for more than a decade if this fact is not made explicit by the file producer. In defense, one could say that the lists provided by the file producers should be comprehensive and therefore include all journals (active or ceased) ever indexed over the database's lifetime. In fact many journals given by database producers are indexed over a short time frame only but are still included in the list of indexed journals. However, in most cases file producers state when the indexing of a specific journal started and when it ended.

4.2.1.6 Different Journals with Identical Titles

Journals with the same name can only be differentiated and multiple occurrences correctly distributed to the databases when their ISSN are given. Identical journal titles occurred, for example, for the two journals both called *Journal of Library and Information Science*, one is published by the National Taiwan Normal University in Taiwan (ISSN 0363-3640) and the other by the University of Delhi in India (ISSN 0970-714X). Another example is the *Christian Librarian*: one published by the Association of Christian Librarians in the United States (ISSN 0412-3131) and the other by the Librarian's Christian Fellowship in the United Kingdom (ISSN 0309-4170).

4.2.1.7 Different Language Titles

Different language titles refer to the fact that one journal can have two different titles: one is the journal's original title in its original language, and the other is a translation of the original title, usually in English. Different language titles are handled differently by A&I services. For example, the Japanese journal *Joho Kanri* (ISSN 0021-7298) also has an English title, *Journal of Information Processing and Management*; it was listed under its English title in LISA, but under its Japanese title in ISTA and LISTA.

4.2.2 Problems Related to Technical Shortcomings

4.2.2.1 Spelling Errors

Spelling errors are always a cause of potential problems when working with databases and are discussed for example by O'Neill & Vizine-Goetz (1989) and Bourne (1977). In this study the most common spelling errors occur for special language characters like ä, ö, ü, é or è. These are usually represen-

ted by the corresponding simple characters without the accent marks. This means, for example, that *Zeitschrift für Bibliothekswesen und Bibliographie* would be listed under *Zeitschrift fur Bibliothekswesen und Bibliographie* or the *Bulletin des Bibliothèques de France* under *Bulletin des Bibliotheques de France* instead. Even though spelling errors of this kind not a major issue when identifying duplicate records, it underlines the importance of searching for different spellings of a title. More problematic was an error that appeared in LISTA, where the journal, *Voice of Youth Advocates* (ISSN 0160-4201), was misspelled as *Voice**s** of Youth Advocates*.

4.2.2.2 Inconsistency in the Spelling of Titles

Inconsistency in the spelling of journal titles have been the concern of a range of studies see, for example, Pao (1989). Jacso (1998) states more recently that in comparing databases

> *... inconsistencies of journal name spelling remained the most significant barrier*. ... The bane of journal coverage studies is the wide intra-database and inter-database scattering of names and abbreviations for the same journals. (p. 135ff)

In this study variant spelling of a journal's title happened on several occasions. The most common example was for titles containing abbreviations and capital letters. A good example is a journal published by *Verlag Neuer Merkur* in Munich, Germany, which is listed in LISA under the name *A.B.I. Technik*, in the EZB as *ABI Technik* and in INFODATA with a dash as *ABI-Technik*. Another common spelling difference appeared in titles containing the word 'and', which sometimes was written out in full but also very often was written by using the character '&'. For example the *Health Information and Libraries Journal* (ISSN 1471-1834) was listed in SSCI, LISA and EZB with the 'and' spelled out and in ASP, ISTA and LISTA with the character '&'

. A third very common spelling discrepancy was the handling of the article 'the' by different databases. For instance LISA, LISTA and ISTA list the journal with the ISSN 0019-4131 under *Indexer* whereas INFODATA and LLIS use *The Indexer* instead. This is especially an issue when alphabetic listing of titles is used to identify duplicate entries.

4.2.2.3 Missing ISSN

In some cases database journals have no ISSN or a database producer gives no ISSN for a specific journal, even though the journal has an ISSN. Missing ISSNs are especially problematic when they are used to identify duplicate journal entries in order to deal with variant spellings. Two examples are: the journal *BuB-Journal : Forum Bibliothek und Information* (ISSN 0340-0301) was missing an ISSN in LISTA; and the *Bulletin of the American Society for Information Science and Technology* (ISSN 0095-4403) was missing an ISSN in LLIS.

4.2.2.4 Wrong ISSN

Another problem involves journals listed with incorrect ISSNs. For instance, in LISA the Spanish journal *Scire: representacion y organizacion del conocimiento* was listed under the ISSN 1135-3761, but the last two digits (61) are in reverse order (16) in the correct ISSN. Another example is the journal *ITD: Information Technology and Disabilities* (ISSN 1073-5127) which appeared under the wrong ISSN 1073-5727 in both EZB and ISTA. Another drastic case was found in ISTA for the *International Journal of Information Technology & Management*: it was listed under the ISSN 0267-5730. However, this ISSN is for the *International Journal of Techno-*

logy Management. The correct ISSN for the first journal should have been 1461-4111.

4.2.2.5 Change of ISSN

From time to time the ISSN number for a journal changes. The reason for this can be either a title change or a change in the publication medium:

> When the wording of a title, as it appears in the title source, is changed, a new ISSN and key title may be assigned depending on whether the change is a major or a minor one. Other changes in continuing resources, like the physical medium are also considered as major changes. (ISSN, 2003:24)

In other words, when the print version of a journal discontinues or a major title change takes place, a new ISSN will be assigned to the journal. This happened, for example with the *ALCTS Newsletter*: it used to have the ISSN 1047-949X, and then changed to 1523-018X when moving from the printed version to the electronic version. However, this practice is not consistent sometimes database producers continue to list the journal under its old ISSN. An example of this is the journal I*nformation Media and Technology* which changed its title in 1992 to *Information Management & Technology* and led to a change of ISSNs from 0266-6960 to 1356-0395. However, the correct ISSN (1356-0395) was only used in LISTA. EZB and LISA still listed the journal with the title change under its old ISSN.

4.2.2.6 Different ISSN for the Electronic and Print Format

More than one ISSN for the same journal is a very common phenomenon. As indicated above, a change of publication medium also requires a change of the journal's ISSN. Thus, journals appearing in different publication

formats carry more than one ISSN even though their content is identical. In some cases, this can make it difficult to match up entries for the same journal in different databases, as most database producers give just one ISSN for a journal that has more than one ISSN. An example of this is the *Bulletin of the American Society for Information Science and Technology* which has a different ISSN for the electronic version (1550-8366) from the print version (1931-6550); LISTA gives the ISSN of the print version only. This is problematic as there is a tendency for journals to cease the printed format. Indeed this happened to the journal above in early 2007, which means only the eISSN would refer to the actual bulletin. In defence of LISTA it should be stated that LLIS gives no ISSN at all and that ASP, ISTA, ASAP and INFODATA only give the ISSN for the old print title from before 2001 (0095-4403), when the journal was called *Bulletin of the American Society for Information Science*.

4.3 The Compilation of the Master List

In May 2007 the listing of journals was acquired from each source described in section 4.1, resulting in a list of 2,527 entries. Details on how many entries came from each source can be found in table 4.2. This list contained many duplicates that subsequently had to be removed in order to compile a listing of unique Information Science related journals.

Duplicate entries were not simply removed; every item was cross-checked in order to apply all details available for each journal that was provided by a subset of files or a single file only. In other words, in order to give as much information as possible for each journal the information from all available sources was combined for the master list of journals. This process had to be done entirely manually in order to overcome the problems as described in

Table 4.2: Number of Journals Contained in the Journal Lists from all Files

	Journals	Other types of Publications	Total
INFODATA	108	0	108
EZB	525	0	525
CC	23	0	23
LISA	413	0	413
LLIS	404	0	404
LISTA	604	144	748
ISTA	197	113	310
ASAP	74	0	74
ASP	119	0	119
SSCI-ISLS	60	1	61
	2527	258	2785

section 4.2 and in order to ensure that all information was available for use in this study. As can be seen in table 4.3, most database producers only gave limited information on the journals indexed.

Table 4.3: Details for the Journals Given by the Different Database Producers

	Title	ISSN	Publisher	Classification	Frequency	Language	Type	Title history	Refereed	Core	URL	Open Access	Country
INFODATA	✓	✓	✓		✓	✓							
EZB	✓	✓		✓									
CC	✓	✓											
LISA	✓	✓	✓										
LLIS	✓	✓			✓	✓		✓			✓	✓	
LISTA	✓	✓	✓				✓	✓	✓	✓			
ISTA	✓	✓	✓				✓			✓			
ASAP	✓	✓	✓	✓				✓	✓				✓
ASP	✓	✓											
SSCI-ISLS	✓	✓	✓		✓								

4 Methodology

To compare all databases fairly it was important to identify the status of journals in order not to bias to databases with high numbers of journals which have ceased. In order to be able to identify active journals, information on the journal's title history was essential. Therefore, after a first run through the list eliminating duplicate entries, the information on the journal's title history provided by LLIS was used to identify journals that had changed their titles. This title history was added to the entry for the new title of a journal, indicating a journal's former name and ISSN number. The journal entry with the old name was then marked as no longer active. Further information on the journal's title history provided by LISTA and ASAP was also used to identify ceased publications. However, a note indicating that a journal is no longer indexed does not necessarily mean that a publication had ceased. Therefore entries for those journals were marked as being likely to be no longer active. Parallel to the journal's history, information on a publication's country of origin and language were extracted from the publisher field where possible.

To round out information on title history, publication language and country of origin, Ulrich's Periodical Directory[27] was consulted to acquire missing information for journals and to confirm the status of specific journals indicated as ceased by LISTA and ASAP. Ulrich's lists details on journals such as publisher, country of origin, price, language, ISSN (for print and electronic version) and a title's history including former names and ISSNs. A search was conducted for all journals identified and a short data set of roughly 1100 journals was downloaded and analyzed.[28] Thereafter, when necessary, the full data set for some of the journals was downloaded as well. As Ul-

[27]Ulrich's Periodical Directory is available online at: ►http://www.ulrichsweb.com

[28]The downloaded data sets are on the CD attached to this thesis. See attached electronic data in the appendix for details on where to find them.

rich's does not contain all journals from the journal master list, it was necessary to conduct a search for the missing items on the ISSN portal,[29] a comprehensive directory on journals with ISSNs. Like Ulrich's, the ISSN portal contains details on, for example, a publication's publisher, language, frequency and status. For a handful of journals without an ISSN and a title search was not successful, a web search was conducted or EZB, where most of the journals are included was consulted to acquire at least a publication's language, status and country of origin.

By adding the missing data from Ulrich's, the ISSN Portal, and EZB it was possible to compile a master list of about 1,200 journals in the area of library and information science. The list has comprehensive information for all journals: name, ISSN, country of publication, language, status and near comprehensive coverage on the journal's title history, publisher and frequency.

4.4 The Overlap of Journals with Other Disciplines

Another objective of this study is to determine the relationships between LIS and other disciplines by investigating the overlap of journals shared between LIS and each discipline sharing the same journal titles. Thus the underlaying assumption is that the number of journals shared between two disciplines expresses overlap between both disciplines. This might be the case when results from one discipline affect the research in another area or when both areas are working on the same subject, but looking at it from different perspectives. To illustrate this relationship, one can look on an information system used by a company from various different views: from a business point of view (e.g. how it helps to increase revenue), from an IT

[29] The ISSN portal can be accessed at: ►http://www.issn.org/

point of view (e.g. what the underlaying hardware and software structure is), from an sociological point of view (e.g. how it influences the social environment of the employees) and of course from an information science point of view (e.g. what the underlaying information processes and information flows are). For that matter, a journal on business information systems might be of relevance to several disciplines (of course depending on the focus the journal takes) and therefore classified as being related to several disciplines and therefore indexed by several A&I services.

Based on the above assumption, the ISSN numbers for active journals classified under different, but possibly related to LIS, subject headings were retrieved from Ulrich's Periodical Directory. The list of journal ISSNs were obtained for a limited number of subject headings: Anthropology; Business & Economics; Communications; Computer; Education; Humanities; Information Theory; Internet; Law; Linguistics; Philosophy; Psychology; Religions & Theology; Social Sciences; and Sociology. As an example for potential extension of this method the list of ISSN numbers of journals indexed for *Psycinfo* were included for Pychology as well. The ISSN acquired for the different subjects were then compared with the ISSN of the journals from the master list of LIS journals. Occurrence of an ISSN was counted as a match for an overlapping journal between both disciplines.

Now we move on to Chapter Five, discussing the results of this study obtained using the methodology described in this Chapter.

5 Results

Bundy & Matthews, 1993

Summary. In this section the results from the study will be displayed. Where possible they will be displayed using tables and figures. The implications of these results will be discussed in detail in chapter Six.

5.1 General Results

The master list of LIS journals, compiled as described in the previous chapter, contained a total of 1,205 different journals (See Table 5.1). Out of those 218 journal were journals which are no longer active. The biggest share of this 218 journals were 109 journals that just changed their titles and are now appearing under new names. To give one obvious example, in 2001 the *Journal of the American Society for Information Science (JASIS)* became the *Journal of the American Society for Information Science and Technology (JASIST)*. This example also shows that despite the fact that JASIS has not been published for more than half a decade, most database producers still included the journal in their list of indexed journals. The second biggest share of the 218 no longer active journals were 95 journals that

were discontinued by their publishers. The third group comprises a relatively small number of fourteen titles that have either been merged with other journals (4) or absorbed by other journals (10). As this study seeks to compile a list of active LIS journals all journals which are no longer active have been excluded from further analysis.

Table 5.1: Number and Percentage for all Databases of the Status of Indexed Journals

	active	not active	no longer indexed	total
INFODATA	96.3%	3.7%	0.0%	
	104	4	0	108
EZB	89.3%	10.7%	0.0%	
	469	56	-	525
CC	95.7%	4.3%	0.0%	
	22	1	0	23
LISA	97.6%	2.4%	0.0%	
	403	10	0	413
LLIS	56.7%	35.6%	7.7%	
	229	144	31	404
LISTA	82.1%	14.2%	3.6%	
	496	86	22	604
ISTA	86.3%	13.2%	0.5%	
	170	26	1	197
ASAP	79.7%	20.3%	0.0%	
	59	15	0	74
ASP	80.7%	19.3%	0.0%	
	96	23	0	119
SSCI-ISLS	96.7%	3.3%	0.0%	
	58	2	0	60
ALL	80.3%	18.1%	1.6%	
	968	218	19	1,205

On top of the 218 inactive journals a further 19 journals have been excluded from the analysis as they are no longer indexed by any of the Information Science related databases included in this study. This exclusion

from further analysis was necessary to ensure that all different sources will be compared on a fair basis that is not affected by journals no longer indexed. Therefore 968 relevant and active journals in the field of LIS are analyzed.

Table 5.1 shows that databases differ widely in their relative share of inactive journals included in their list of indexed journals. For most of the sources, active journals made up close to, or above 90% of all journals as given by the database producers and therefore, in most cases the number of journals included in this study does not differ vastly from the number of journals reported. However, the list of indexed journals for LLIS and LISTA each contained more than 100 journals which are no longer published or which are no longer indexed. In terms of percentage, this is especially bad for LLIS, where almost half the journals listed by the file producer will not contribute to new records on future updates of the database.

5.2 Ranking of the Journals

As the main aim of this study is not merely to compile a comprehensive list of LIS related journals, but to rank those journal by their relative importance for the discipline as measured by the number of databases in which a journal appeared. The assumption behind this measure is that the more important a specific journal is for the discipline, the more likely it is that it will be included by an indexing and abstracting service in its database. Therefore, journals which are essential to the discipline form a cluster of core publications that will be included in all, or nearly all, databases. However, journals which are not of substantial importance to the discipline will tend to be indexed by fewer databases. This assumption proved to be correct for the data set. The vast majority (71.5%) of the journals from the

master list were included by only one or two databases and just a small number of journals were indexed by the majority of databases. This relationship is shown in figure 5.1 - the number of journals versus the number of databases that contain these journals.

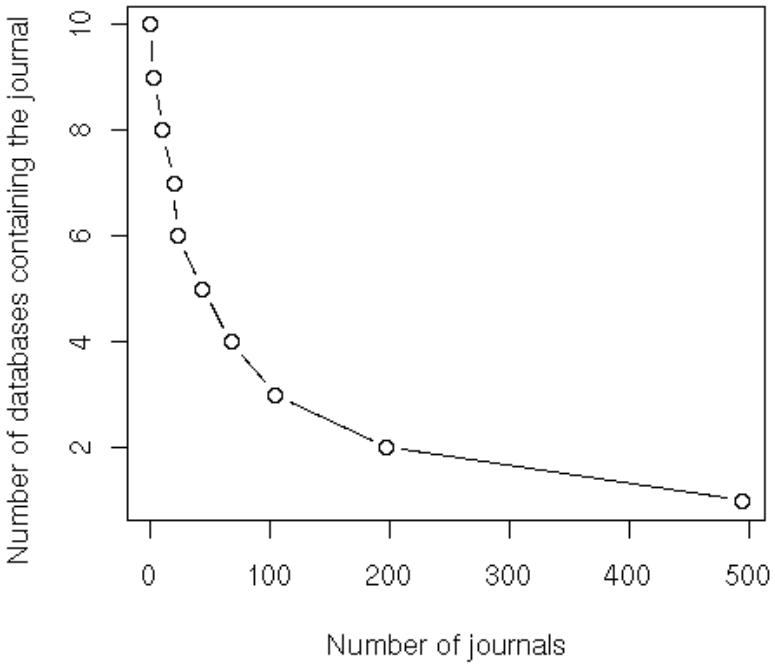


Figure 5.1: Distribution of Journals over the Databases

As can be seen, the plot shows very clearly the characteristic of a skewed distribution. This means there are just a few journals included in all databases and an increasing number of journals included in just a few databases. The number and percentages for this plot can be found in table 5.2, which gives the relative share of journals in relation to the total number of journals. This table reveals, for example, that only 0.41% of all journals are included in nine or more databases and that more than half of the journals (51.0%) are included in just one database. The shape of this distribution also justifies the ranking of journals in a Bradford like manner, which means it can be assumed that most of the relevant articles in LIS will appear in a few journals, and that in order to get the same amount of relevant articles the number of journals has to be increased exponentially. Therefore,

the number of databases that index a journal can be transformed into a rank value, where 10 reflects the highest possible value for a journal and 1 the lowest possible rank.

Table 5.2: Number and Share of Journal Contained in Databases

	Number of Journals	Share of all Journals (%)
10 databases	1	0.1
9 databases	3	0.3
8 databases	11	1.1
7 databases	20	2.1
6 databases	24	2.5
5 databases	44	4.5
4 databases	68	7.0
3 databases	105	10.8
2 databases	198	20.5
1 database	494	51.0
Total	968	100.0

The fifteen journals ranked at the top are listed in Table 5.3. All top fifteen journals appear in English and are either from the USA or the UK. It is also noteworthy that all journals in the top fifteen are peer reviewed and that none of the journals is an Open Access journal. These fifteen journals can also be described as a set of *core journals* for LIS. Journals with the ranking numbers five to seven form a second group of journals. This group contains a total of 88 journals, an equivalent to 9.1% of all journals, which can be described as encompassing the *central journals* of the discipline. Following the central and the core journals is a third cluster which is formed by combining the journal ranks three and four. These 173 journals represent 17.9% of all journals and can be described as *selective journals* because the journals in this group are mostly journals which are for specialized areas within

Table 5.3: List of the Top-15 Journals in LIS, in Alphabetical Order

Journal title and title addition	ISSN	Rank
American Libraries : The magazine of the American Library Association	0002-9769	8
Aslib Proceedings : New Information Perspectives	0001-253X	8
College and Research Libraries	0010-0870	8
Information Processing and Management	0306-4573	9
Information Technology and Libraries	0730-9295	10
Information Today : The newspaper for users and producers of electronic information services	8755-6286	8
Journal of Information Science (JIS)	0165-5515	9
Journal of the American Society for Information Science and Technology	1532-2882	8
Library and Information Science Research	0740-8188	8
Library Resources and Technical Services	0024-2527	8
Library Trends	0024-2594	8
Online : The leading magazine for information professionals	0146-5422	9
Online Information Review : The international journal of digital information research and use	1468-4527	8
Program : Electronic Library and Information Systems	0033-0337	8
The Journal of Academic Librarianship (JAL)	0099-1333	8

the field. The largest group of journals is formed by the 672 journals having a rank of one or two, a total 71.5% of all journals. Journals that fall into this category can be described as *rim journals*, which are on the border between LIS and other disciplines or fields of general interest. The four groups are visualized in Figure 5.2 by gray areas.

The list of all 968 journals can be found in the appendix and as an Excel table on the optical data medium attached to this thesis.

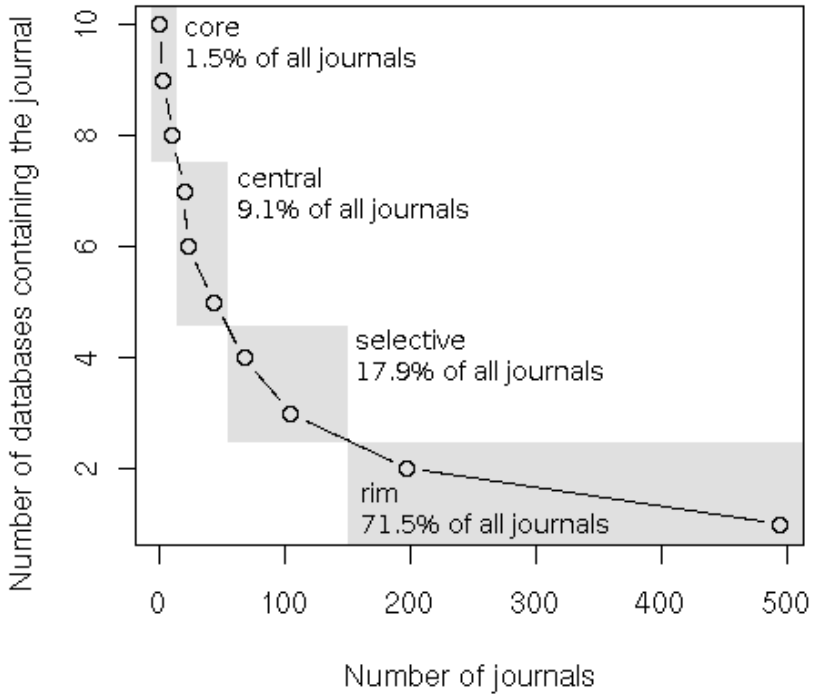


Figure 5.2: Visualisation of the Four Zones of Journals Categories

5.3 Overview of the Characteristics of LIS Journals

Summary. This section will look at some characteristics of LIS journals. These characteristics are the share of peer reviewed journals, the languages the journals are published in, the geographical distribution of those journals, the share of Open Access journals and the Journal Impact Factors for LIS journals if available.

5.3.1 Peer Reviewed Journals

Almost half of all journals from the master list are peer reviewed journals, articles in these journals go through a reviewing process before being published. In academia peer reviewing is believed to ensure the quality of articles published and is therefore a 'quality' criteria when assessing journals. However, it is important to mention that not all publications on important

current developments relevant for the field undergo peer review; these include items in news bulletins or computer magazines.

Table 5.4 gives an overview of the number and share of peer reviewed journals for all database sources. As can be seen, most databases have a relatively high share of peer reviewed journals. The highest is for SSCI-ISLS with a share of nearly 95% and the lowest is for EZB with a share of just about 33%. However, the EZB is the only source in the data set that does not index journals, but only compiles a comprehensive list of journals available in electronic form. Therefore, the aim of this database is to include more than just the most valuable sources. It is, however, striking that both German databases, CC and INFODATA have a share of peer reviewed journals which is 10% and 20% respectively lower than that of the other LIS specific databases.

Table 5.4: Number and Share for all Databases of Peer Reviewed Journals

Rank	Database	total number of Journals	Peer Reviewed (number)	Peer Reviewed (%)
1	SSCI-ISLS	58	55	94.8
2	ISTA	170	136	80.0
3	ASP	96	67	69.8
4	LISA	403	268	66.5
5	LLIS	229	150	65.5
6	LISTA	496	323	65.1
7	ASAP	59	37	62.7
8	CC	22	12	54.5
9	INFODATA	104	45	43.3
10	EZB	469	156	33.3
	ALL	968	409	42.3

5.3.2 Languages of LIS Journals

For this analysis of languages it is important to keep in mind that one journal can publish articles in more than one language. Therefore, the total number of the occurrences of languages is higher than the total number of journals. Overall there were 32 different languages for LIS journals identified in this study.

Table 5.5: Share for the Languages English and German and the Language Families for all Other Languages of LIS Journals

Database	English (%)	German (%)	Romance (%)	Germanic[1] (%)	Slavic (%)	Asian (%)	Other[2] (%)
ASAP	100.0	0.0	0.0	0.0	0.0	0.0	0.0
ASP	99.0	0.0	1.0	1.0	0.0	0.0	0.0
SSCI-ISLS	94.8	3.4	1.7	0.0	0.0	1.7	0.0
ISTA	92.4	1.2	4.7	1.2	0.6	1.8	1.2
LLIS	91.3	3.5	4.8	2.6	0.4	0.9	1.3
LISTA	90.1	2.2	4.6	2.4	1.4	2.4	1.0
LISA	83.6	3.2	5.0	4.0	2.7	4.2	2.5
CC	68.2	40.9	0.0	0.0	0.0	0.0	0.0
EZB	61.4	16.2	13.4	7.5	5.1	1.5	1.7
INFODATA	51.0	52.9	1.9	1.0	1.0	0.0	0.0
ALL	72.2	12.4	8.3	4.6	3.6	2.5	1.5

[1] Other than German; [2] Baltic, Finno-Hungarian, Altaic, Indo-Iranian, Afro-Asiatic

As can be seen in Table 5.5 almost three-quarters of all journals publish articles in English. Nevertheless, there was a substantial difference between the sources for the relative share of English serials, stretching from all journals in ASAP to just about half in INFODATA. The second most common language for LIS journals included in this study is German, having a total share of 12.4% of all serials. When looking at the shares for German journals in the three German sources (INFODATA, CC and EZB) it becomes evident that most of the German journals are coming from them. Excluding

English and German, the most common language family for LIS journals is Romance languages, with 8.3% of all serials included in this study. Looking at the details for this language family in Table 5.6, it can be seen that Span

Table 5.6: Details for Languages of Indexed Journals, for all Databases

		INFO-DATA	EZB	CC	LISA	LLIS	LISTA	ISTA	ASAP	ASP	SSCI-ISLS	ALL
	English	53	288	15	337	209	447	157	59	95	55	699
	German	55	76	9	13	8	11	2			2	120
Other Germanic and northern Germanic	Swedish	1	16		4	2	5					19
	Danish		10		4		2					12
	Norwegian		5		2		1					6
	Dutch		2		3	2	2					5
	Afrikaans		2		2	2	2	2		1		2
	Icelandic				1							1
Asian	Japanese		6		11	1	6	3			1	17
	Chinese		1		6	1	6					7
Romance	Spanish		24		7	1	9	4		1	1	29
	French	2	19		6	7	7	2				25
	Italian		8		2	1	3	1				11
	Portuguese		8		4	2	4	1				11
	Catalan		3		1							3
	Romanian		1									1
Slavic	Polish		3		5		4					7
	Russian		3		2	1						6
	Slovenian	1	2		1		1					4
	Croatian		2		2		2	1				4
	Czech		4									4
	Serbian		4									4
	Slovak		3		1							3
	Serbo-Croatian		2									2
	Bulgarian		1									1
Other (Baltic, Finno-Hungarian, Altaic, Indo-Iranian, Afro-Asiatic)	Finnish		2		2	1	1					4
	Hungarian		2		2	1	2	2				3
	Lithuenian		2		1							2
	Turkish		1		2		1					2
	Arabic		1									1
	Persian				1							1
	Urdu				1	1	1					1

ish (29 serials) followed by French (25 serials) are the most important lan guages within this family and the third and fourth most common languages out of all the languages. They are followed within their language family in ranking by Italian and Portuguese, both being the language for articles in 11 serials each. Catalan and Romanian are the least occurring languages within this family. The Germanic family follow the Romance languages. As English and German are excluded from this family, the three Northern Germanic Languages: Swedish (19 serials), Danish (12 serials), and Norwegian (6 serials) are the most important subgroup within this family, with Swedish also being the fifth most common language out of all languages. Dutch, Afrikaans and Icelandic are the least prevalent languages within this group. Within the other language families: Slavic, Asian, Finno-Hungarian, Baltic, Altaic, Indo-Iranian and Afro-Asiatic, only four languages are the language of more than four journals: Japanese (17 serials and also the sixth most common language), Polish and Chinese (both with 7 serials each), and Russian (6 serials). For details on the number of publications for all languages and their distribution over the databases, see Table 5.6.

5.3.3 Geographical Distribution of LIS Journals

As language is not a direct indicator as to where a specific journal is published, the countries of the publishers of the 968 journals were analyzed as well. In total the journals originate from 60 different countries. An overview of the number of publications from each country and the distribution over the databases can be found in Table 5.7. As can be seen no database is comprehensive in its coverage. Therefore the combination of databases, as used in this study is necessary to identify the publications from all 60 countries. The databases with the widest international focus is EZB, listing

Table 5.7: Countries of LIS Journals

Country	INFO-DATA	EZB	CC	LISA	LLIS	LISTA	ISTA	ASAP	ASP	SSCI-ISLS	ALL
Algeria		1									1
Argentina		1		1		1	1				2
Australia		5		6	4	8	4	4	3		13
Austria	1	8		2							9
Bangladesh						1	1				1
Belgium		2									2
Bosnia & Herzegovina		2									2
Botswana				1	1	1	1				1
Brasilia		4		1		1					5
Bulgaria		1									1
Canada	2	13		12	12	17	4	3	3	2	30
Chile		2									2
China				1		1					1
Colombia				1	1	1	1				1
Costa Rica						1					1
Croatia		2		3		3	1				5
Cuba				1		1	1				1
Czech Republic		5									5
Denmark		9		3	1	2					10
Egypt		1									1
Finland		4		3	1	2					7
France	1	11		5	2	3	2				14
Germany	55	69	9	14	8	15	3		1	4	117
Hungary		2		3	1	3	3			1	4
India		1		5	3	12	4				12
Iran		1		2							3
Ireland					1	1					1
Island				1							1
Israel										1	1
Italy		10		2	1	3	1				13
Jamaica				1							1
Japan		8		12	1	6	3			1	20
Lithuania		2		1							2
Malaysia				2	1	2					3
Mexico		2		1		1	1				2
Netherlands	7	14	2	19	4	20	4	2	2		34
New Zealand				1	1	3			1		4
Nigeria						2					2
Norway		3									3
Pakistan				1	1	1					1
Peru		1									1
Philippines						1					1
Poland		4		5		4					8
Portugal		4		4	3	2	1				6
Puerto Rico		2									2
Romania		2									2
Russia		3		2	1						6
Serbia		4									4
Singapore		3				4					6
Slovakia		3		1							3
Slovenia	1	3		1		1					5
South Africa		3		6	2	7	2		3		7
Spain		17		5		5	1		1	1	19
Sweden	1	17		2	2	3					18
Switzerland		4			1						5
Taiwan		1		5	1	7	1				8
Tanzania				1							1
Turkey		1		2		1					2
UK	16	66	4	127	42	113	45	5	21	22	177
USA	20	148	7	137	133	236	85	45	61	26	348

journals from 44 different countries, followed by LISA and LISTA with 40 and 38 countries respectively. On the other end of the spectrum are CC and ASAP, both indexing LIS journals from fewer than five different countries.

In terms of the total number of publications, the USA is the most active country for publishing LIS journals. The countries with the second and third highest number of publications are the UK and Germany. Two thirds of all LIS related publications originate from the top three countries, with the USA contributing more then one-third. For the bottom one-third of journals, the distribution of the countries is much more even.

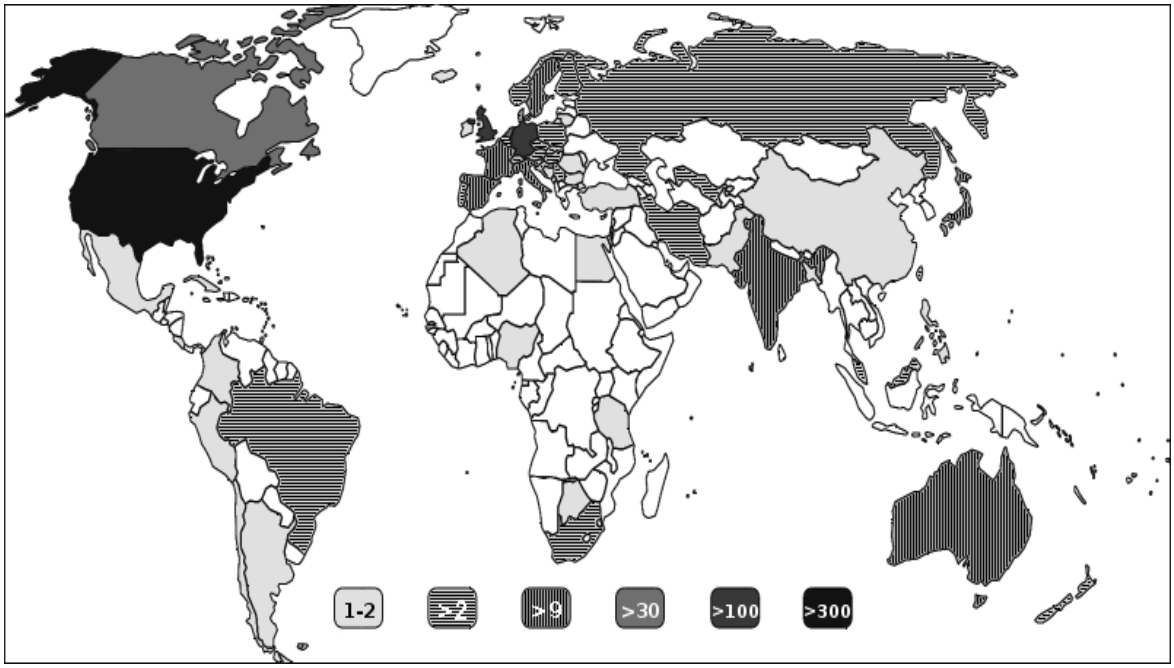


Figure 5.3: The Geographic Distribution of LIS Journals

The geographical distribution of LIS journals is visualized in Figure 5.3. Depending on the number of journal that originate per country, the countries of the world fall into six zones. Zone one and two are formed by the top three countries as described above. Zone three consists of the Netherlands and Canada, both with 30 or more journals. Eight countries with between 10 to 29 fell into category four. The other two zones are formed by the remaining 47 countries: zone five consists of twenty countries with more than

two but less than ten publications, and zone six consists of 27 countries with just one or two journals each.

5.3.4 Open Access in LIS Journals

Access to the literature is an important factor in any research project. For academics it is important to identify relevant literature for a specific project as well as to gain access to this literature. Often libraries of universities have subscriptions to 'important' journals and academics can gain access to this literature via their libraries. In recent years access is increasingly provided not just by a physical copy of the journal in the library, but also by a subscription to electronic version of a journal. However, if the library has no copy of a specific journal available or no subscription to the electronic version, the relevant literature has to be obtained by using an inter library loan or document supply services.

Open Access (OA) is one way to ensure that academics are able to obtain the relevant literature they need for their research. Open Access in the context of this study means that journals are accessible for a researcher on the internet without extra cost. However, there are other definitions and views on OA - see, for example, Herb (2007) and Jacobs (2006). OA in this study means, for example, that the *IFLA Journal* is an OA journal even though a single print issue costs an institution $93; a PDF version of papers in this journal are available for free on the net at IFLA's homepage.

Table 5.8 shows that 153 LIS related journals are available are OA journals - this is almost 16% of all journals. Apart from CC all databases include OA journals, with EZB having the highest share; more then one-fourth of their journals listed are OA. Out of the subject specific literature reference data-

bases LLIS has the highest share of OA journals - 13.5% of all their journals; however, LISTA has 41 OA journals, ten more than LLIS.

Table 5.8: Number and Share for all Databases of Journals Available Free of Charge

Rank	Database	total number of Journals	Open Access (number)	Open Access (%)
1	EZB	469	124	26.4
2	LLIS	229	31	13.5
3	INFODATA	104	12	11.5
4	ISTA	170	17	10.0
5	ASAP	59	5	8.5
6	LISTA	496	41	8.3
7	LISA	403	32	7.9
8	ASP	96	5	5.2
9	SSCI-ISLS	58	3	5.2
10	CC	22	0	0.0
	ALL	968	153	15.8

For the fifteen 'core' journals, (Table 5.2) none are OA journals and only three of the 44 'central' publications are OA journals: the *Bulletin of the American Society for Information Science and Technology*, the *Journal of the Medical Library Association (JMLA)* and the I*FLA Journal*. Seventy-eight percent of all Open Access journals fall in the 'rim' category journals (See Figure 5.2).

5.3.5 Journal Impact Factors of LIS Journals

As can be seen in Table 5.9 just over 10% of all 968 journals have JIFs (see Chapter Three for a discussion of the Journal Impact Factor). This means when one tries to rank LIS journals using their JIFs, 90% cannot be ranked. However, there are huge differences in the share of journals with

Impact Factors when comparing databases: from just 5.8% in EZB to 86.2% for SSCI-ISLS.

Table 5.9: Number and Share for all Databases of Journals Having a JIF

Rank	Database	Total number of Journals	Having a JIF (number)	Having a JIF (%)
1	SSCI-ISLS	58	50	86.2
2	CC	22	10	45.5
3	ASAP	59	17	28.8
4	INFODATA	104	29	27.9
5	ISTA	170	43	25.3
6	ASP	96	19	19.8
7	LISA	403	73	18.1
8	LISTA	496	81	16.3
9	LLIS	229	33	14.4
10	EZB	469	27	5.8
	ALL	968	105	10.8

Looking at the total number of journals having JIFs included by the different databases, LISTA has the highest coverage - 81 out of 105 journals with JIFs. For the 105 journals having JIFs, the Impact Factor ranges from 0.00 for the journal *Library and Information Science* to 5.06 for the *ACM Transactions on Information Systems.*

The average JIF over all 105 journals is 1.03 (Table 5.10), with ASAP being the only database that exceeds this average for its collection of journals (1.33). The lowest JIF average is 0.60 for LLIS. Figure 5.4 shows a plot of the JIFs for all 105 journals. As can be seen the distribution is very skewed, with 68 journals having JIF of one or less and just twelve journals having a JIF larger than two.

Table 5.10: Minimum, Maximum and Average JIF for all Databases

Rank	Database	Average JIF	Maximal JIF	Minimal JIF
1	ASAP	1.33	5.06	0.18
2	INFODATA	1.01	4.73	0.08
3	LISTA	0.97	5.06	0.00
4	CC	0.95	2.12	0.30
5	SSCI-ISLS	0.89	4.73	0.00
6	ISTA	0.84	3.98	0.00
7	LISA	0.84	5.06	0.08
8	EZB	0.78	2.12	0.08
9	ASP	0.69	1.24	0.27
10	LLIS	0.60	1.56	0.00
	ALL	1.03	5.06	0.00

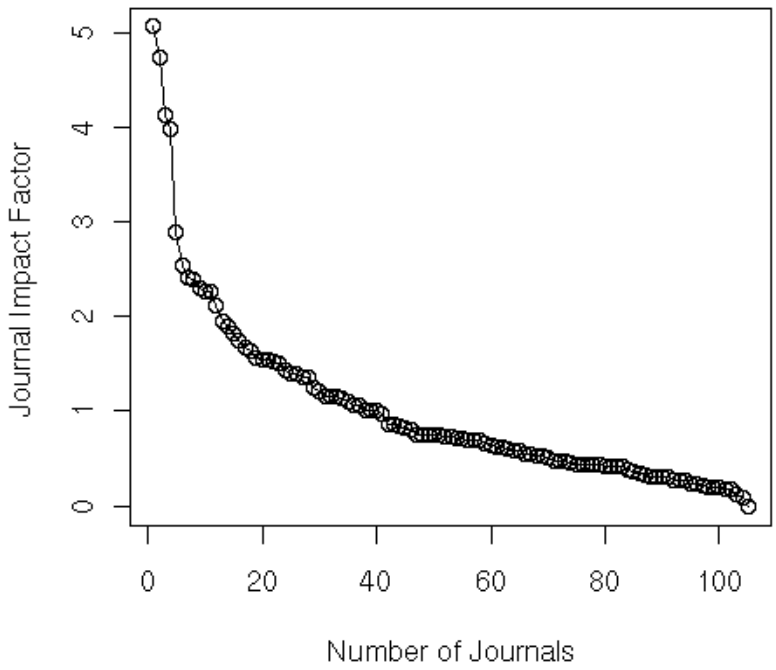


Figure 5.4: Distribution of JIF over Journals

Comparing the results for the Impact Factor with Colonia (2002:52), the average JIF of 1.04 for LIS journals is significantly higher than 0.40 estimated by Colonia. Even the value of the Database with the lowest average JIF lies above 0.40. There are three possible explanations for this difference. Firstly, their study included just 50 journals, which generally might have a lower

average than the 105 journals in this study. Secondly, they calculated JIFs for some of the journals not listed by ISI, which they called rIF (regional Impact Factor). This rIF is, however, a lower appraised value of the real Impact Factor of a journal. Finally there is a general tendency for the average JIF to grow over the years, which also might explain the difference between their values based on the JCR from 1997-2000 and this study, based on the JCR from 2006.

5.4 German LIS Journals

The master list included a total of 117 journals from Germany (Table 5.7) and nine of the ten databases cover journals from Germany. In terms of coverage of journals from Germany, EZB and INFODATA provide the highest coverage with 69 and 55 journals, respectively. However, as can be seen in Table 5.11 neither comes close to covering all the 117 journals from Germany.

Table 5.11: Coverage of German Journals by the Different Databases

Rank	Database	Total number of Journals	Share of German journals (%)
1	EZB	69	59.0%
2	INFODATA	55	47.0%
3	LISTA	15	12.8%
4	LISA	14	12.0%
5	CC	9	7.7%
6	LLIS	8	6.8%
7	SSCI	4	3.4%
8	ISTA	3	2.6%
9	ASP	1	0.9%
10	ASAP	0	0.0%

From the non-German LIS specific databases LISTA and LISA cover the highest number of journals, at fifteen and fourteen journals respectively. The lowest coverage of LIS journals from Germany is provided by the large multi-disciplinary databases ASP and ASAP which cover one or none each.

Table 5.12 lists the top fourteen journals in LIS published in Germany. Of those journals five are published in English and one publishes selevtive articles in English. Comparing this result for the top fourteen journals with all journals from Germany it seems that if a journal is published in English, it is more likely to be indexed by more international databases, therefore making its contents more visible internationally. Out of all 117 journals 101 are in German, twelve in English and four in both languages.

Table 5.12: Top 14 LIS Journals from Germany in Rank Order

Journal title and title addition	ISSN	Rank
LIBRI : International Journal of Libraries and Information Services	0024-2667	7
Knowledge organization (KO) : International journal. Devoted to concept theory, classification, indexing, and knowledge representation	0943-7444	6
Zeitschrift für Bibliothekswesen und Bibliographie (ZfBB)	0044-2380	6
Information - Wissenschaft und Praxis	1434-4653	5
Bibliothek : Forschung und Praxis	0341-4183	5
Restaurator: International Journal for the Preservation of Library and Archival Material	0034-5806	5
Bibliotheksdienst	0006-1972	4
Der Archivar Mitteilungsblatt für deutches Archivwesen	0003-9500	4
BuB-Journal : Forum Bibliothek und Information	0340-0301	4
ABI Technik: Zeitschrift für Automation, Bau und Technik im Archiv-, Bibliotheks- und Informationswesen	0720-6763	4
Liber Quarterly : The Journal of European Research Libraries	1435-5205	3
Bibliotheksforum Bayern	0340-000X	3
IM : Die Fachzeitschrift für Information Management and Consulting Additional Title Information	1616-1017	3
Microform and Imaging Review	0949-5770	3

This means for all 117 journals the proportion with English content is just 14% as opposed to 43% for the top fourteen journals. If the focus is even narrower, just looking at the six journals from Germany that fall under the

category 'central' (see section 5.2), the ratio for English climbs even higher about two-thirds of all journals.

Looking at two other quality criteria of journals, the Journal Impact Factor and peer review, the ratio for both is clearly lower for German journals then for all journals. For peer review, just 12.8% of all 117 journals from Germany are peer reviewed, whereas the average for all 968 journals from around the world is 42.3%. For the JIFs the difference is not that drastic: 5.1% of all German journals have JIFs in contrast to 10.8% for all journals worldwide. However, for the top fourteen journals the picture changes, as both the JIF as well as the share of peer reviewed journals rise clearly above the world's average. For the top fourteen journals the share of peer reviewed journals is 50% and the number of journals carrying a JIF is 29%.

5.5 Overlap between the Databases

The approach taken in this study not only allows an analysis of the journals in LIS but also a comparison of the sources used in this study with each other. Therefore this section looks at the degree to which the different databases overlap with each other. Table 5.13 shows the number of journal titles that overlap between two databases. As the upper half and the lower half of the matrix show the same values, just one half is displayed. In terms of total number of journals overlapping between two sources, the highest value appears for LISTA and LISA, both sharing 318 journals. However, as the different databases have different sizes, the number of journals shared by two sources does not really reflect the degree to which two sources overlap. Therefore, a measure of overlap has to take into account the relative size of each database.

Table 5.13: Number of Journals that Overlap between Databases

	INFODATA	EZB	CC	LISA	LLIS	LISTA	ISTA	ASAP	ASP	SSCI-ISLS
INFODATA										
EZB	36									
CC	22	7								
LISA	43	148	9							
LLIS	31	110	5	156						
LISTA	47	162	11	318	209					
ISTA	31	94	5	129	99	157				
ASAP	14	23	5	35	32	39	25			
ASP	18	51	2	61	58	86	47	25		
SSCI-ISLS	22	30	6	45	35	45	37	16	21	

One measurement that does pay attention to the different sizes of databases is the two-way relative overlap measure (see chapter 3.2.1.3). Applying a two-way overlap to the values for each database from Table 5.13 results in a matrix representing the similarity between two databases. The different sizes of the databases as well as the relative difference of size between two sources (e.g. small with big, big with big, small with small) are taken into account. Therefore, the values in the upper and the lower triangle of the matrix are different as shown in Table 5.14. At first this perhaps seems odd, but it will become clearer after one example on how this difference makes sense is given. This natural may even be an improvement on the classical measure of overlap that just gives only one value for the overlap between two sources. A comparison of CC and INFODATA will be used to illustrate this difference. To find out how much CC overlaps with INFODATA, one has to look at the row for CC and find the cell where this row intersects with the column for INFODATA. In this case the value is 100%, indicating that all titles contained in CC are also contained in INFODATA. If the question is,

however, to what degree INFODATA overlaps with CC, one has to go to the row for INFODATA first and then find the cell where this row intersects with the column for CC. In this case the value is just 21.2%, indicating that just less than one-quarter of all journals indexed for INFODATA are also indexed for CC. This example makes it clear that even though the overlap between CC and INFODATA is very high, the same does not apply to the overlap between INFODATA and CC, where the overlap is not very high. In fact INFODATA overlaps more with any other of the four LIS specific databases (LISA; LLIS, LISTA, ISTA and EZB) than with CC.

*Table 5.14: Two-way Overlap between the Different Sources**

	INFODATA (%)	EZB (%)	CC (%)	LISA (%)	LLIS (%)	LISTA (%)	ISTA (%)	ASAP (%)	ASP (%)	SSCI-ISLS (%)
INFODATA (%)		34.6	21.2	41.3	29.8	45.2	29.8	13.5	17.3	21.2
EZB (%)	7.7		1.5	31.6	23.5	34.5	20.0	4.9	10.9	6.4
CC (%)	100.0	31.8		40.9	22.7	50.0	22.7	22.7	9.1	27.3
LISA (%)	10.7	36.7	2.2		38.7	78.9	32.0	8.7	15.1	11.2
LLIS (%)	13.5	48.0	2.2	68.1		91.3	43.2	14.0	25.3	15.3
LISTA (%)	9.5	32.7	2.2	64.1	42.1		31.7	7.9	17.3	9.1
ISTA (%)	18.2	55.3	2.9	75.9	58.2	92.4		14.7	27.6	21.8
ASAP (%)	23.7	39.0	8.5	59.3	54.2	66.1	42.4		42.4	27.1
ASP (%)	18.8	52.1	2.1	62.5	59.4	88.5	49.0	25.0		21.9
SSCI-ISLS (%)	37.9	51.7	10.3	77.6	60.3	77.6	63.8	27.6	36.2	

* The data has to be read by row in order to get the value of overlap between two sources.

The data from Table 5.14 can be used to find out which combination of database services is optimum. For example, if a library already offers access to one of the services and decides to cover more LIS journals by subscribing to another service, it can look for a database combination with a low overlap, thereby ensuring that the new database adds maximum benefit to their existing service. Another use can be to guide academics in maximizing the

number of journals searched in a minimum number of databases. In this case the researcher would look for the lowest value in a column after searching one source. Therefore, after searching INFODATA, a good place to extend the search for literature would be LISTA, as just 9.5% of the journals in this database are covered in INFODATA.

5.5.1 MDS Map of the Overlap between Databases

In this section Multidimensional Scaling (MDS) is used to visualize the results for the overlap between the different databases. MDS is a statistical method to visualize the degree of similarity between different 'objects' by creating a map that reflects the 'distance' between those objects. Thus, objects which are more similar to each other appear closer to each other on such a map than objects which are different to each other. For an introduction to MDS see for example Kappelhoff (2001) or Garson (2007).

MDS has already been used in other studies to visualize the overlap between different databases on both the level of overlapping articles (Walters & Wilder, 2003) and the level of overlapping journal titles (LaBorie, et al. 1985). In this study the ALSCAL algorithm from SPSS was used to compare the different databases. In order to use MDS the similarities matrix from Table 5.14 had to be transformed into a euclidian distance matrix, reflecting the distance between the different sources. This was done by subtracting the value in Table 5.14 from 100 and therefore creating a matrix that reflected the *dissimilarity* between two sources. The values in this matrix now reflect the distance between the different databases, with the most dissimilar databases being furthest away from each other and similar databases being closer to each other. Running the ALSCAL algorithm with a euclidian distance matrix for the values from Table 5.14, however,

gave poor results for the R^2 and stress level for the resulting plots in two and three dimensions. In order to overcome this limitation the overlap between the different databases was calculated again using the traditional method for calculating overlap used by LaBorie, et al. (1985). Using the results from this calculation as input for the MDS, the resulting plot was satisfactory, having a stress value of 0.064 and R^2 of 0.98 in two dimensions which is, according to Garson (2007), good enough to allow interpretation.

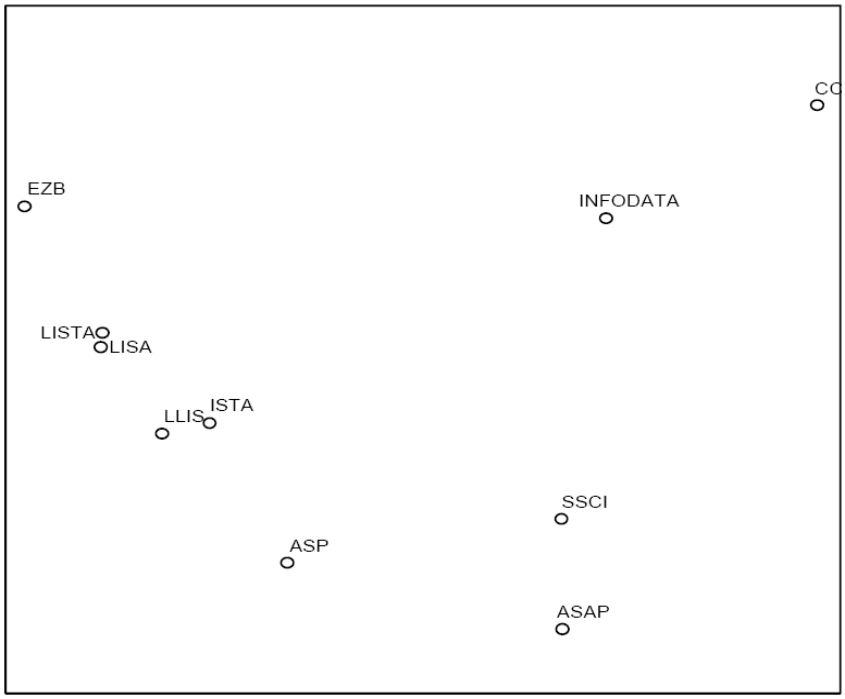


Figure 5.5: Multidimensional Scaling Map of the Overlap Between Databases

As can be seen in this plot the three databases from Germany (EZB, INFODATA and CC) are located in the upper half of the figure and databases indexing fewer sources from Germany are located in the lower half. Also, the three multidisciplinary databases, ASP, SSCI and ASAP are all located in the lower half of the plot around the middle, and the four subject specific databases are similar by clustering close to each other in the middle on the left side of the plot. The similarity of LISTA and LISA in this figure is also striking, with both databases being the closest to each other. The simil-

arity of the four international LIS related databases in this plot also indicates a consensus among them in to what LIS is about. Of the three multidisciplinary databases, ASP seems to have a subset of its journals closest to the collection of LIS related journals as defined by the four international LIS related databases. The relative distance (dissimilarity) between SSCI's collection of Information Science and Library Science related journals to those in the four databases LISA, LISTA, ISTA and LLIS indicates quite a different view of LIS.

5.6 Overlap between LIS and other Disciplines

The compiled master list of LIS related journals can also be used to assess the scope to which LIS overlaps with other disciplines. The idea behind this assumption is that if a journal is relevant for academics from two disciplines it indicates an overlap between both disciplines. Thus, the more journals two disciplines share the more both disciplines overlap with each other. In this sense results from one discipline are of relevance to the other discipline and could therefore have an influence on the further development of the related discipline.

In order to measure the overlap with other disciplines, joumal lists for other disciplines had to be created and then these lists had to be compared with the master list of LIS-related journals. As time for creating the journal lists for other disciplines was limited, the subject headings of disciplines used by Ulrich's Periodical Directory® were used to create a list of ISSN numbers related to the other disciplines which where then matched up with the master list of LIS journals. However, as ISSN numbers were used for this comparison just the 893 journals of the master list having ISSNs were used to calcu-

late the overlap between two disciplines. The results for the overlap between LIS and the fifteen chosen disciplines are shown in Table 5.15.

Table 5.15: Common Journals with Other Subjects, Based on Subject Headings from Ulrich's

Rank	Subject	Number of Common Journals with LIS	% of Common Journals with LIS*
1	Computing Studies	85	9.5
2	Business and Economics	77	8.6
3	Psychology	37	4.1
4	Education	36	4.0
5	Communications	32	3.6
6	Information Theory	31	3.5
7	Internet	26	2.9
8	Law	19	2.1
9	Social Sciences	11	1.2
10	Sociology	10	1.1
11	Religions & Theology	7	0.8
12	Philosophy	6	0.7
13	Linguistics	3	0.3
14	Humanities	2	0.2
15	Anthropology	1	0.1
	All Disciplines combined	285	31.9

* The overlap percentages are based on the 893 LIS journals with ISSNs.

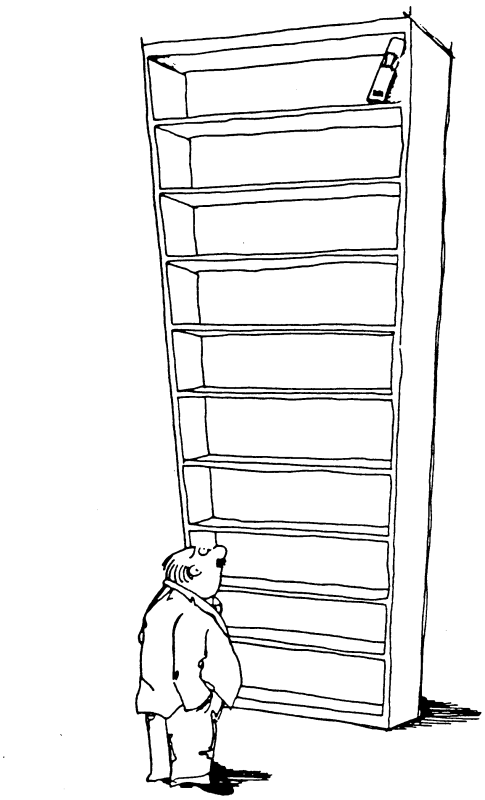
The share of overlap between LIS and individual disciplines range from 9.5% for *Computing Studies* to 0.1% for *Anthropology*. LIS has the greatest overlap with the disciplines *Computing Studies* and *Business and Economics*, with roughly every eleventh journal being shared among LIS and these two disciplines. LIS also has a clear overlap with the disciplines *Psychology*, *Education*, *Communications* and *Information Theory*, having more than 30 journals in common with each. Noteworthy overlaps also exist with the disciplines *Internet*, *Law*, *Social Sciences* and *Sociology*. For the remaining five

disciplines the overlap is minimal, which might also be due to the fact that for scholars of those disciplines books and not journal articles are generally the most important means of communication.

A closer look at the journals that overlap with the other disciplines shows that a wide range of journals is responsible for the overlap with other disciplines. Indeed, most of the journals were only overlapping between LIS and one or two other discipline. Only three journals overlapped with four disciplines: *Behaviour and Information Technology*, the I*nternational Journal of Information Management* and *Social Science Computer Review*. The fact that one-third of all journals relevant to LIS (285) are also of interest to other disciplines underlines the multidisciplinary character of LIS.

The following chapter will discuss the results presented in this chapter in a wider context.

6 Discussion



Bundy & Matthews, 1993

Summary. The results presented in the previous section will be discussed critically in this chapter. Some longitudinal analysis are drawn and, comparisons to previous studies are made where possible.

6.1 Discussion of Methodical Problems

Complaints about the lack of standardization in databases for journal titles as for example those by Williams & Lannom (1981), Piternick (1982) and Stefanik (1987), roughly a quarter of a century ago still represent a major issue when working with journal titles from different databases. The increasing use of ISSN for most serial publications has proven to be a valuable tool when working with serials from different sources. However, the

practice of database producers not updating the ISSN of journals when the title changes can create a major hurdle when looking for identical journals in different databases or even within one database. It is also possible that using the current ISSN of a journal could exclude results for articles published under the previous name of a journal. The same problem arises due to the requirement of the ISSN specification to have different ISSNs for the print and online version of a journal, even though the content is identical. This does not really help with matching up different journal titles using ISSNs, as the only way to circumvent this problem is to ensure that all ISSNs of a journal used currently and in the past in print or electronically, are combined. A fact most users might not be aware of when searching for journal literature. This problem is also of special importance when the coverage of specific journals in different databases is the scope of an Informetric study.

Another issue that might effect research are errors in ISSNs. Some of the most evident examples are already mentioned in chapter 4.2 and will not be repeated here. EZB seems to be particularly bad in omitting and mistyping ISSNs; for example, the ISSN of *Evidence Based Library and Information Practice*, is missing entirely; and for *EBSS Newsletter 9* was substituded with *7*, transforming the correct ISSN (0887-5189) into 0887-5187. But other databases show the same errors; for example, LISA reversed *16* to *61* in the ISSN for the Spanish journal *Scire: representacion y organizacion del conocimiento*.

6.2 Implications for Individual Databases

6.2.1 INFODATA

INFODATA is the database with the highest share of journals from Germany and journals published in German. Fifty-five of all 104 journal indexed by the database are from Germany; that is, almost 53% of all journals included in this source. Excluding EZB, which does not index the content of journals, INFODATA also has the best coverage of German journals, indexing 47% of all German LIS journals; this is more than three times as many as LISTA, the second ranking database. The coverage for top international publications in INFODATA is also good, with only *Library Trend* missing from the list of identified core journals. Curiously the database is missing three of the top-fifteen journals published by German publishers, all three from K.G. Saur: *Restaurator*, *Liber Quarterly*, and *Microform and Imaging Review*. However, all three are published in English and apart from *Liber Quarterly*, fairly specialized publications. Over all INFODATA has a good composition of journals that make it indispensable when looking for relevant LIS publications from Germany. The fact that the database is bilingual indexed in German and English also makes it an important source of interest to the international LIS community, especially for researchers trying to keep up with the development of research and practical applications of LIS in Germany.

6.2.2 Elektronische Zeitschriften Bibliothek (EZB)

The EZB is the only source used in this study that does not actively index the content of journals. Therefore, the claim of this source is not to list the most relevant journals, but to give a comprehensive listing of journals

available electronically - a claim that cannot be entirely fulfilled as some electronic journals are not included; for example, *Information Technology for Development*, *The Journal of Electronic Publishing*, and *Journal of Digital Information*. The different focus of EZB also becomes obvious when looking for journals; quality is not a criterion for being included in EZB. The share of peer-reviewed journals and journals having JIFs are lowest in EZB with 33% and 6%, respectively. EZB's strengths are its fairly comprehensive coverage of journals from different countries, published in different languages and are Open Access journals. Especially for Open Access EZB, has a coverage not even closely matched by any of the other sources listing three times as many journals as the second ranking database.

6.2.3 Current Contents, by IZ Potsdam (CC)

CC is the smallest secondary source included in this study, just indexing the contents of 22 journals, which are all also included in INFODATA, making CC a complete subset of its 'bigger brother'. CC's composition of journals is lacking coverage of most of the identified international core journals for LIS. Even though they are included in INFODATA just four of the top-fifteen journals are indexed for CC. The coverage for German journals also seems questionable as some of the 'rim-journals' from Germany are included in CC's small collection of just nine journals from Germany, but more prestigious or important journals from Germany, such as: *Information – Wissenschaft und Praxis, Knowledge Organization*, *Zeitschrift für Bibliothekswesen und Bibliographie*, *Bibliothek : Forschung und Praxis*, and *BuB-Journal : Forum Bibliothek und Information* are missing. Given the small number of journals the number of mistakes for ISSNs in the journal list provided by the producer is also striking. For example, *Medien und Kom-*

munikationswissenschaft and *Online Information Review* are both listed under their old ISSN. One can just hope that CC is quicker in covering the content of recent publications than it is in updating information on the journals they cover. However, this investigation is outside the scope of this thesis.

6.2.4 Library and Information Science Abstracts (LISA)

In terms of the total number of journals covered, LISA is the second biggest database indexing 403 LIS journals. In terms of the range of journals indexed from around the world and published in languages other than English, no database can match LISA's scope. LISA indexes journals from 40 different countries, published in 26 different languages. Looking at the different languages covered in LISA over time indicates that LISA has extended its range of different languages covered at the expense of mostly Russian and German language material; however with 13 German titles, LISA has the highest coverage of German language material of all non-German databases (Table 6.1). The downside of LISA's good international focus is that, even though LISA has also a good coverage of 'core' and 'central' journals, it

Table 6.1: Languages Over Time in LISA

	Edwards (1975) (%)	Bottle & Efthimiadis (1984) (%)	Boell (2007)* (%)
English	69	79.3	83.6
German	7	5.9	3.2
French	4	1	1.5
Russian	2	5.4	0.5
Spanish and Portuguese		1.5	2.7
Japanese		1	2.7
Other	18	5.9	11.4
Total No. of diff. Lang.	20	n/a	26

* Sum is more than 100% as some journals are published in multiple languages.

lacks coverage of selective journals and favors 'rim' journals including 43% of all journals indexed by LISA.

6.2.5 Library Literature and Information Science (LLIS)

Perhaps the most striking fact about LLIS is the massive difference in the number of journals listed as indexed and the number of journals actively published. Of the *400*+ periodicals indexed by the database just 229 are active journals. Even though LLIS has a decent percentage of peer reviewed journals it has the lowest percentage of journals with JIFs and also the lowest average JIF out of all sources indexing LIS literature involved in this study. However, LLIS is the secondary source with the highest share of Open Access journals - making up 14.4% of all journals currently indexed by LLIS. Looking at the coverage of languages over time in LLIS does not reveal any major changes in the relative share of languages in the databases composition (Table 6.2). In terms of similarity to other databases, 91.3% of all journal included in LLIS are also indexed by LISTA.

Table 6.2: Languages Over Time in LLIS

	Edwards (1975) (%)	Boell (2007)* (%)
English	87	91.3
German	2	3.5
French	2	3.1
Russian	1	0.4
Other	8	6.6
Total No. of diff. Lang.	10	15

* Sum is more than 100% as some journals are publised in multiple languages.

6.2.6 Library, Information Science and Technology Abstracts (LISTA)

LISTA indexes the most journals out of all ten databases - almost 500 active journals; there is also a massive overlap with journals indexed by other databases ranging from 45% of the journals indexed by INFODATA to 92% of the journals indexed by ISTA. It is also the database indexing the highest number (41) of Open Access journals. In terms of international coverage and languages other than English, it is, however, just the second largest of the indexing sources. Still, it covers journals in 20 different languages from 38 different countries. LISTA is also the non-German sources indexing the highest number of journals published in Germany. Thus, the size of the database and the fact that it can be accessed free of charge makes it a primary choice for searching LIS publications.

6.2.7 Information Science and Technology Abstracts (ISTA)

Of the four large international databases indexing LIS journals,[30] ISTA is the smallest, indexing only 170 active journals. Like LISTA ISTA is produced by EBSCO which predestines both databases for comparison with each other. For both quality criteria (the share of peer-reviewed journal and the share of journals having JIFs), ISTA is doing better, with 80% vs 65% and 25% vs 16%, respectively. The picture reverses, however, when looking at the average JIF; here ISTA is slightly behind. In terms of coverage of international journals, publications in languages other than English, and Open Access journals, ISTA is far behind its 'bigger brother'. Over the years ISTA's coverage of different languages seems to have declined, especially for Ger-

[30]The four big international databases are: LLIS, LISA, ISTA, and ISTA

man and French (Table 6.3). Also 92.4% of the journals covered by ISTA are also included in LISTA. Therefore, just looking at the criteria assessed in this study, it seems odd to invest in a database when the majority of its content plus many other journals can be searched for free.

Table 6.3: Languages Over Time in ISTA

	Edwards (1975) (%)	Bottle & Efthimiadis (1984) (%)	Boell (2007)* (%)
English	69	90.7	92.4
German	4	5.6	1.2
French	5	0.5	1.2
Russian	9	0.9	0.0
Spanish and Portuguese		0.0	3.0
Japanese		1.4	1.8
Other	13	0.9	3.5
Total No. of diff. Lang.	15	n/a	10

* Sum is more than 100% as some journals are published in multiple languages.

6.2.8 Expanded Academic ASAP

ASAP claims to be *unparalleled in its depth and scope*, however, it lists only 74 journals under LIS related headings and 20% are no longer published; this leaves only 59 actively indexed journals. Looking at the coverage of different languages also casts doubts on ASAP's claim, as it is the only source indexing solely English LIS publications. Therefore it is not surprising, that the coverage of publications from different countries is shallow, indexing literature from just five different countries. Even more worrying for LIS researchers is the fact that, apart from CC, it is the source with most of the core journals missing: *Aslib Proceedings*, *College and Research Libraries*, *Library and Information Science Research*, *Journal of Academic Librarianship*, *Online Information Review*, and *Program* are all not indexed by this database. On the positive side ASAP does well with the share of journals

having JIFs and the average JIF. The shallow coverage of core publications and international journals, however, make ASAP just a secondary choice when looking for publications of relevance to LIS.

6.2.9 Academic Search Premier (ASP)

Like the previously discussed database, ASP is a general multidisciplinary database indexing the literature of a number of different subjects. Also like ASAP, it has a share of roughly 20% of journals no longer published and it mainly focused on material published in English, making up 99% of all content. Coverage of material from around the world is therefore shallow, just including publications from nine different countries, and only one publication from Germany. Out of all databases covering Open Access material ASP tied for the last rank in terms of relative number of OA journals - which are just 5% of all journals. The journals covered by ASP also show a high overlap with LISTA, which covers 89% of all journals listed as LIS in ASP. Even though it is beyond the general scope of this study, looking at ASP's classification of journals subject categories reveals some interesting details. For example, journals like *Online Information Review*, *Journal of Documentation*, and the *Canadian Journal of Information and Library Sciences* are included in ASP, but they are *not* classified as LIS. This is especially odd, as ASP's journal listing is not restrict to just one subject per journal. ASP also seems to have dropped coverage of *JASIST*, as it just lists *JASIS* on the list of included journals. If this is, however, just an error in updating the journal list or if ASP is indeed no longer indexing this important publication is outside the scope of this study. Even though ASP has decent coverage of most core publications to LIS and a better coverage of LIS than ASAP it also

should not be the 'premier' choice when looking for publications of relevance to LIS.

6.2.10 SSCI – Information Science and Library Science

SSCI's collection of LIS journals is clearly the best of all sources when it comes to journal quality. In terms of the number of peer reviewed journals and the number of journals having JIFs, SSCI has the highest share of all databases, with 95% and 86%, respectively. Despite the frequent criticism on Tomson Scientific databases having a bias towards publications in English, SSCI is not the database with the highest share of English publications, but it is still is one of the databases biased more towards English than most others, with 95% of all included journals being published in this language. Also in the coverage of OA journals SSCI is at the lower end, tying for last place in terms of relative number of journals being OA and last in terms of the total number of OA journals included, when looking at all databases covering OA publications. Most striking about SSCI is, however, that it has a relatively high share of publications being unique to this database. Almost 16% of all journals included in this source, are not listed in any of the other sources; that is for those journals SSCI is the only database classifying them as LIS journals. This indicates also, that Thomson Scientific has a slightly different view of LIS than that of the other database producers. This is also indicated by the relative distance of SSCI to the other four big international secondary sources on LIS in the MDS map (Figure 5.5). Therefore one should be cautious about the general representativeness for the whole of LIS, when SSCI's subsection on LIS journals is used for rankings.

6.3 Journal Rankings over Time

Pope's (1975:212) statement that "*little work has been done in any field to determine the correlation between journal ranks measured at different times*"(:212) still remains valid, at least for LIS. Apart from LaBorie et al. (1985), which tried to follow-up Goldstein's (1973), Nisonger's (1999) analysis of JASIST position in different rankings from 1952 to 1997, and some replications of Kohl & Davis (1985), it seems that no attempt has been undertaken to compare the results of different journal rankings over time. The reason for that might be, that most of the studies use different approaches and that it is therefore hard to compare their rankings with each other. However, there have been previous studies analyzing the journal coverage between different secondary sources and in all cases the same approach was used to generate the list of core journals and it is appropriate to compare the list of journal common to all sources identified in previous studies to the list of core journals from this study. Comparing the list of core journals identified in previous studies with a similar approach (Buntrock, 1964; Gilchrist, 1966; Dansey, 1973; Goldstein, 1973; Edwards, 1975; LaBorie, et al., 1985; Bobinski, 1985) reveals three different sets of journal groups.

Group one, displayed in Table 6.4, shows a list of journals that were ranked core in previous studies and managed to achieve good results in this study as well. *Information Outlook*, *Library Resources and Technical Services*, and the *Journal of the American Society for Information Science and Technology (JASIST)* managed to be listed as core journals in all studies over the last 43 years. Even Though *Aslib Proceedings* was not in the core in one study, it was still ranked fairly high. Similarly the *Journal of Documentation* was ranked core in all former studies, but just missed the criteria in this study.

6 Discussion

As it turned out it was included in ASP after all, but not listed under LIS, therefore it was not counted for that database even though it should have been. Therefore, it is safe to include these two journals from Britain in the list of 'old timers', forming a list of top five publications with continuing importance for LIS. Ten years later (and thirty years ago) *Information Pro*

Table 6.4: List of LIS Core Publications 1964 to 2007

	Buntrock (1964)	Gilchrist (1966)	Dansey (1973)	Goldstein (1973)	Edwards (1975)	LaBorei et al. (1985)	Bobinski (1985)[1]	Boell (2007)[2]	Former Titles
Information Outlook	X*	X	X	X	X	X	X	X	Special Libraries
Library Resources and Technical Services	X*	X	X*	X	X	X	X	X	New Directions in Technical Services; Library Resources & Technical Services
JASIST	X	X	X	X	X	X	X	X	JASIS; American Documentation
Aslib Proceedings	X*	X	X	X	X		-[3]	X	
Information Processing and Management			X	X	X	X	-[3]	X	Information Storage and Retrieval
College and Research Libraries			X	X	X	X	X	X	
Information Technology and Libraries			X	X		X	X	X	Journal of Library Automation
American Libraries	X*		X*					X	A L A Bulletin
Library Trends			X*			X	X	X	
Program			X				-[3]	X	
Reference and User Services Quarterly						X	X	X	RQ
Journal of Information Science			X				-[3]	X	Information Scientist
Journal of Academic Librarianship, The							X	X	Started 1975
Library and Information Science Research							-[3]	X	Library Research; Started 1979
Information Today								X	Started 1983
Online							-[3]	X	Started 1977
Journal of Documentation		X	X	X	X	X	-[3]	6	
Library Quarterly			X	X	X	X	X	6	
Library Journal	X*	X	X	X			X	6	
Journal of the Medical Library Association		X	X*		X			6	Bulletin of the Medical Library Association
Journal of Librarianship and Information Science			X	X	X		-[3]	6	Journal of Librarianship
Libri			X				-[3]	6	
Online Information Review						X	-[3]	6	Online & CD-ROM Review; Online Review
International Information and Library Review			X*	X		X	-[3]	5	International Library Review
Indexer			X	X			-[3]	5	

* Listed as 'core' by the original author on basis of the number of articles indexed.

[1] The study focused on US journals only.

[2] Maximum Rank 8; Excludes EZB and CC for ranking; therefore 'X' includes Ranks '8' and '7'

[3] Journal was excluded from this study.

cessing and Management, *College and Research Libraries*, and *Library Quarterly* joined this exclusive club of very important publications. Only four of the core journals identified in this thesis have not been mentioned as core publications in any of the previous studies. However, having a closer look at them reveals that they all started in the late seventies or early eighties, giving them little time to build up their reputation and achieve top status by the mid-eighties. Especially as the last two studies (La Borie et al., 1985; and Bobinski, 1985) collect their data already some years before their publication.

The second group of journals, listed in Table 6.5, consists of journals in previous publications classified as core journals, but have ceased in the meantime and therefore could not be ranked in this study. Curiously most of these journals were from outside the US, with the demise of the *Unesco Bulletin for Libraries* being the most regrettable.

Table 6.5: List of Ceased, Previously High Ranked Publications

	Buntrock (1964)	Gilchrist (1966)	Dansey (1973)	Goldstein (1973)	Edwards (1975)	LaBorei et al. (1985)	Former Titles
Unesco Bulletin for Libraries	X*	X	X	X	X	X	
Wilson Library Bulletin			X*	X		X	
Aktualne Problemy Informacji i Dokumentacji		X	X		X*		
Canadian Library Journal			X*	X			
Studii si Cercetari de Documentare			X		X*		
Bibliotheki SSSR			X				
Dokumentation, Fachbibliothek, Werksbücherei DFW			X				D F W Dokumentation-Information
Inspel			X				
Revue Intern. de la Documentation	X						
LARC Reports				X			

* Listed as 'core' by the original author on basis of the number of articles indexed

The third group is displayed in Table 6.6 and consists of journal that were less successful in maintaining their importance for LIS. They split in two categories the first half of journals are still included in LIS databases or the LIS subsection of the larger databases, but achieve considerably lower

Table 6.6: List of Journals with Decreased Importance

	Buntrock (1964)	Gilchrist (1966)	Dansey (1973)	Goldstein (1973)	Edwards (1975)	LaBorei et al. (1985)	Boell (2007)[1]	Former Titles
Bulletin des Bibliothèques de France		X	X	X			4	
InfoTrend			X				3	Tidskrift for Dokumentation
Documentaliste			X		X*		3	
Library and Information Update	X*	X	X*	X			3	Library Association Record
Information – Wissenschaft und Praxis	X		X		X*		3	Nachrichten fuer Dokumentation
Informatie Professional				X			3	Open; Login
Library of Congress Information Bulletin				X			3	Information Bulletin
Microform and Imaging Review				X			3	Microform Review
Annals of Library and Information Studies			X				2	Annals of Library Science and Documentation
Communications of the ACM			X				2	
Biblioteka			X				1	Bibliotekar'
Wirtschaftsinformatik (WI)			X				1	Angewandte Informatik; Elektronische Datenverarbeitung
Methods of Information in Medicine		X			X*		1	
Bibliotekarz			X*	X			1	
Nauchno-Tekhnicheskaya Informatsiya			X		X		1	
Informatik			X				-	
Journal of Chemical Information and Modeling		X	X		X*		-	Journal of Chemical Information and Computer Sciences; Journal of Chemical Documentation
Informatique et Gestion			X				-	
Information Hotline; Information Reports					X		-	Information News and Sources; Information, Part 1 & 2; Scientific Information Notes; Information Reports and Bibliographies
Journal of Micrographics			X*		X*	X	-	
IEEE Transactions on Professional Communications			X		X*		-	IEEE Transactions on Engineering Writing and Speech
Science		X	X		X*		-	
Nature			X				-	
Microdoc			X				-	
Language Resources and Evaluation			X				-	Computers and the Humanities
Information and Computation			X				-	Information and Control

* Listed as 'core' by the original author on basis of the number of articles indexed

[1] Maximal Rank 8; Excludes EZB and CC for ranking

rankings in this study then previously, indicating that several secondary sources dropped their coverages; the second category are journals that used to be indexed in LIS-type secondary sources, but are no longer listed as LIS in any of the ten sources used in this study. The reason for that might be that both the journals and LIS developed in different directionsm and, therefore the coverages of these sources no longer made sense for LIS databases. For example, it seems that LIS has lost research interest in micro formats with *Journal of Micrographics* and *Microdoc* having two journals related to this topic; both were previously ranked as core journals but now no longer indexed by any of the LIS sources. However, for some sources it is unfortunate that not even one of the producers of secondary sources considers them for selective indexing any longer. For example, both *Science* and *Nature* have regular articles on Internet search engines which are of interest for LIS researchers and therefore should be indexed by at least one of the databases that claims to cover the topic search engines.

6.4 Database Coverage over Time

Gluck (1990) notes the lack of studies comparing the journal overlap between databases over time, stating that, apart from LaBorie, et al. (1985) which updates data from Goldstein (1973), he is not aware of any longitudinal analysis. For this reason the following section will compare the results from this study to LaBorie et al. (1985), Goldstein (1973) and, where applicable, others to put the journals in a longitudinal context. Three aspects could be derived from previous studies and compared to the present study: the size of databases in terms of journals indexed, the overlap between two databases, and the distribution of journals over databases.

Size. Figure 6.1 shows the number of journals indexed by ISTA, LISA and LLIS from 1964 to 2007, reproducing the figures from previous studies as listed in Table 6.7. It seems that after expanding their size in terms of number of journals covered in the 1980s, all three services have shrank in size since the LIS research boom in the late 1970s and 1980s. Of all three sources ISTA is showing the greatest fluctuation, doubling its size from the early 1970s in the 1980s to roughly 700 journals and then dropping to 300 journals in 2000 and less than 200 journals in 2007. In comparison to ISTA, LISA seems to have managed to maintain its increased size from the eighties throughout the nineties into the new millenium. According to the connecting lines between the different measures in Figure 6.1, LISA became the databases indexing the most journals around a decade ago. In terms of size LLIS is the most constant source, being reported with around 200 journal in almost all studies since 1966.

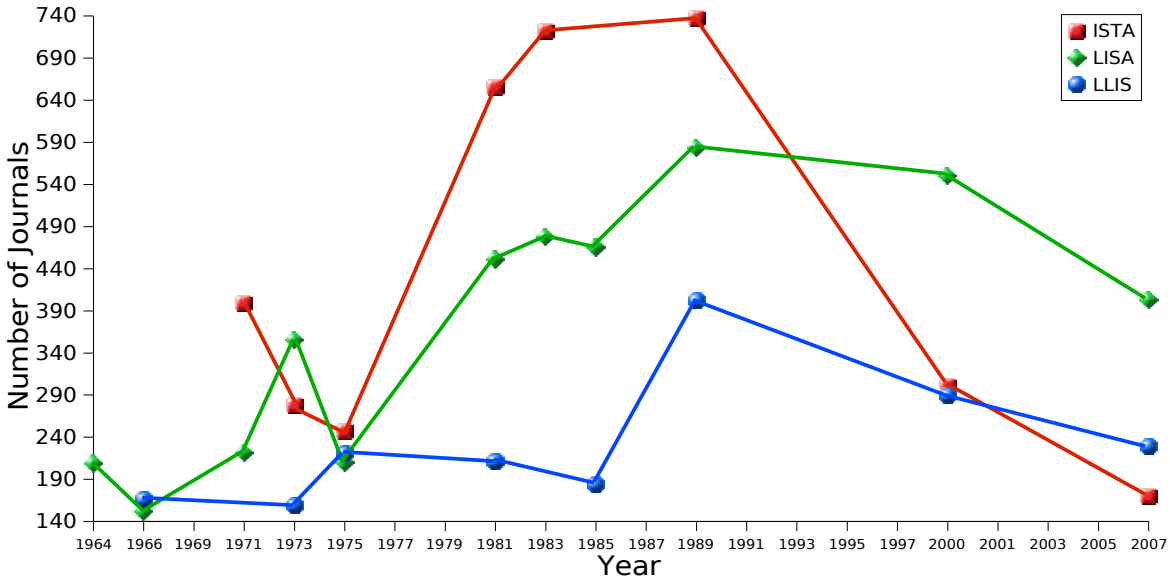


Figure 6.1: Number of Journals in ISTA, LISA, and LLIS 1964 to 2007

Table 6.7: Number of Journals Indexed by ISTA, LISA, and LLIS 1964 to 2007

	ISTA	LISA	LLIS
Buntrock (1964)		209	-
Gilchrist (1966)		152	166
Dansey (1971)	399	221	-
Goldstein (1973)	278	355	159
Edwards (1975)	247	210	221
Bottle & Efthimiadis (1984)	722	478	199
LaBorie et al. (1985)[1]	655	451	211
Stieg & Atkinson (1988)[2]		465	184
Nicholls (1989)	737	583	403
Read et al. (2000)	300	550	290
Boell (2007)[3]	170	403	229

[1] Data refers to 1981; [2] Data refers to 1985
[3] Active journals only;

Overlap. Just a hand full of previous studies measured the overlap between databases at the journal title level. All values reported for the overlap between any of the database combinations used in this study were extracted from previous studies and reproduced in Table 6.8. As none of the previous studies used the two-way overlap approach to measure overlap, only the 'simple' method was used to calculate the overlap in order to make the results comparable.

Table 6.8: Overlap between ISTA, LISA, and LLIS 1973 to 2007

	Goldstein (1973)	Edwards (1975)	Bottle & Efthimiadis (1984)	LaBorie et al. (1985)[1]	Boell (2007)
ISTA-LISA	17.4	12.3	7.6	10.8	29.1
ISTA-LLIS	11.5	10.1	n/a	7.4	33.0
ISTA-SSCI	n/a	n/a	n/a	23.8	19.4
LISA-LLIS	36.7	26.0	n/a	25.4	32.8
LISA-SSCI	n/a	n/a	n/a	9.2	10.8
LLIS-SSCI	n/a	n/a	n/a	10.9	13.9

[1] Data refers to1981

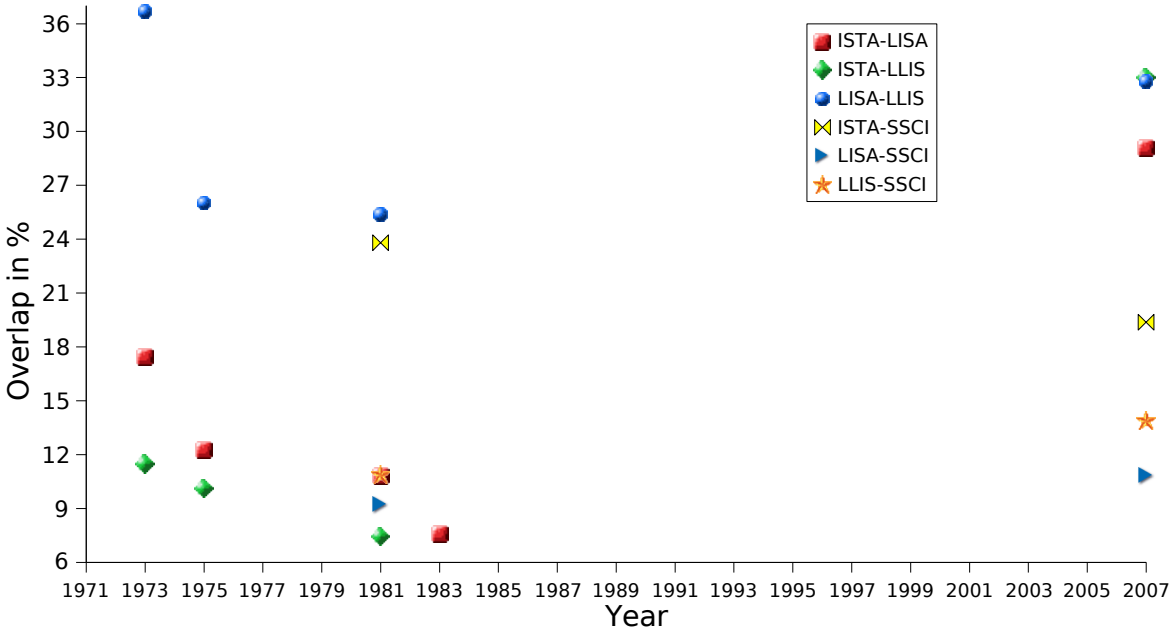


Figure 6.2: Overlap between Secondary Sources over Time

Figure 6.2 shows that for most of the database combinations the overlap value remained relatively constant over the years. The exception is, however, ISTA which seems to have changed its composition dramatically since the 1980s; it it now closer to the other sources in its composition than before. ISTA's overlap with LISA and LLIS of less then 10% at the beginning of the eighties jumped up to roughly 30% with both sources in 2007 (Table 6.8). In combination with the findings reported in the previous section this indicates that ISTA mainly dropped coverage for journals that differentiated ISTA from the other two databases.

Distributions. The distribution of journals over databases as reported by studies since 1964 is defined as the number of journals indexed by one, two, three,... databases. In most cases the maximum number of databases a journal could be included in is four; however, some studies were reporting distributions for more than four databases: Gilchrist (1966) and Goldstein (1973) both used five, Edwards (1975) six, Buntrock (1964) seven and this

study uses nine.[31] The total number of journals in all studies range from 747 reported by Buntrock (1964) to 1,391 reported by Bottle & Efthimiadis (1984). As non of the earlier studies indicated that they attempted to remove non-active journals from their lists, the complete journal master list of 1205 journals is used for this comparison.

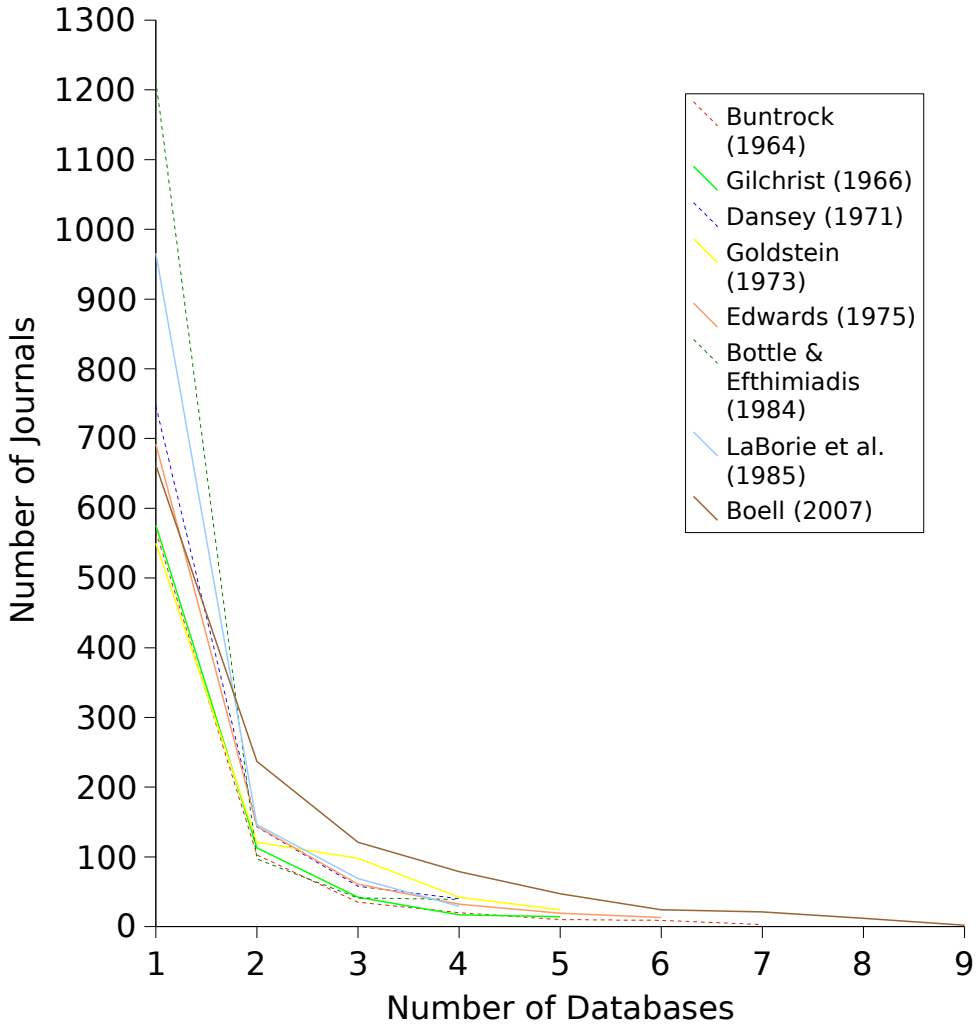


Figure 6.3: Distribution of Journal over Secondary Sources

Figure 6.3 all studies show the same characteristic for their journal distribution over multiple sources. This underlines the stability of the ranking method applied in this study over time. The figure also indicates that if more sources are involved the distribution becomes more stable. Most of the

[31]The number of sources was reduced to nine, as CC is a complete subset of INFODATA and therefore does not add any additional journals.

studies using just four databases for their analyze show a peak for the number of journals included in just one database; the number of journals included in multiple databases quickly drops. In contrast, studies using an increasing number of databases show a less dramatic drop from single to multiple databases. This indicates that the number of sources used is crucial for a reliable journal ranking, a fact also underlined by Goldstein (1973). He showed that the list of core journals, defined as journals common to all databases, changes depending on which combination of three databases (out of five) he used. Therefore, the more databases are involved for ranking the journals the more reliable the ranking will be. In this sense the present study is unique as it used the highest number of secondary sources of direct relevance to LIS-literature so far.

After discussing the results in this chapter, by putting them into a wider context, we will now move on to the final chapter with the conclusion of this study.

7 Conclusion

Bundy & Matthews, 1993

Summary. This chapter will give a brief overview of what has been accomplished in this study and what contributions have been made to research. The limitations will also be described and directions for further research given.

7.1 Introduction

The main goal of compiling a comprehensive list of serials publishing articles of relevance to LIS was achieved. The list not only includes currently published journals, but also details on former journals that either changed their title, merged with other journals or ceased. Comparing the journal titles to earlier studies ranking LIS serials indicates that all publications of major importance are included. Combining the information on journals given by each secondary source enabled a detailed analysis of the characteristics of LIS journals. The most important places of publication and languages for LIS serials were identified along with the number of peer reviewed journals, journals with JIFs, and Open Access journals. Ranking the journals by

the number of A&I services which track them proved fruitful and showed a clear Pareto-like distribution of the journals over the secondary sources; this distribution was successfully used to identify a list of LIS core journals. Analyzing the overlap between databases at the journal level was also fruitful and provided an important update of earlier studies. The approach of investigating the overlap between different academic fields using the number of overlapping journals was successfully used and demonstrated a new way for future research to present the academic landscape.

7.2 Contribution

The results presented in this study are of interest to different groups of stakeholders: Academics who need to identify relevant journals, databases or database combinations when searching for LIS-literature will find the results helpful. Librarians can use the journal ranking for assessing and managing their journal collection or for the comparison and evaluation of literature reference databases through coverage of their journal collection in different databases. The results can also be used to investigate the acceptance of different open access journals. The journal ranking can also be used when comparing publications in different journal by qualitative criteria; for example, for promotion and tenure decisions (Nisonger & Davis, 2005), or more generally for all kinds of research evaluation (Everett & Pecotich, 1991). Researchers looking for a place to publish their works might find a comprehensive list of journals useful in order to pick the best outlet for their publications. The results are also of potential significance to academic teaching, for example, when setting up curriculum reading lists, to ensure that students are familiar with all important publication outlets. It might also be useful in making students aware of important secondary sources for

searching the LIS literature. The results also provide a potential baseline for other researchers: for example, the question of how widely countries differ in their representation of important national LIS publications in databases need a comprehensive listing of LIS journals. A comprehensive list is also necessary for investigating to see if journals with an international orientation are indexed by more databases than journals with only national focus. The method used can also be extended to other publication outlets such as books and conference contributions. Editors, publishers and database producers might also be interested in the findings.

To show the practical use of the results, the number of LIS journals covered by Scopus was measured. As it turned out this citation database provides a much better coverage of LIS publications than SSCI, allowing citation analysis of roughly four times as many LIS journals as its competitor.

7.3 Limitations

A general limitation of the journal list is the inclusion of only journals listed as indexed by any of the secondary sources assessed. Journal of importance to LIS that were not listed by any of the sources are therefore not included in the journal master list. This limitation is of less importance when the 'core' publication of the field is identified by at least one of the secondary sources. It becomes, however, more important for 'rim' journals, as clearly some publications of national importance for some countries are missing. For example, the number of journals from South Korea and the Peoples Republic of China are clearly underrepresented, as the listing includes no journal for South Korea and just one for China. Clearly this limitation also applies to many other countries with just a few or no listing of journals in the journal master list.

An other limitation applies to the journal ranking. It should be stated that using just the number of secondary sources that index a journal as the only ranking criteria is a one-dimensional approach that misses a lot of other aspects relevant when assessing a journal's importance. Nevertheless, it provides a useful approach, as it seems plausible that no secondary source can afford to exclude the most central journal publications in a field without complains from its customers. This study is therefore just one part of a larger effort to rank journals. As Coleman (2007:1152) states, future rankings of LIS journals should use "*a battery of techniques of journal assessment rather than relying on a single method.*" Stock (2001) suggests for example circulation, reputation of publishers, or JIFs that is related to the length of an article.

Walters & Wilder (2003), LaBorie et al. (1985), as well as others have pointed out that indexing of one journal by a service is not necessarily indexing of the same journal by an other service. Therefore, listing a journal as overlapping between two services might not be accurate, as both services could index different articles in the same journal so that their coverage does not overlap at all. It might also be the case that two services have different indexing strategies and that therefore the same article is indexed with different keywords by each service; thus, searching with some keywords will lead to a positive retrieval from one database and searching with different keywords is needed for a positive retrieval from another database. Distinguishing at the article level was not done in this study; therefore, the results reflect the overlap between databases based on the simple assumption that all services index all articles in each journal. Therefore the results regarding the overlap are just a measure for the upper boundary of the possible overlap between two sources.

It is also important to point out, that the journal lists given by the database producers could have been incomplete or not current. For the large multidisciplinary databases, ASP, ASAP and SSCI, only the journals explicitly classified as LIS were included. Therefore some journals from the journal master list that are included in the database, but have not been classified as LIS by the database producer, were not counted when calculating the overlap for these three sources or the ranking of the journals. A brief test revealed that for all three databases the number of journals rise significantly when considering this limitation.[32] However, it is important to stress that this did not affect the comprehensiveness of the journal master list.

7.4 Directions for Further Research

Further comparison of the databases on different level should be undertaken at a next stage. Questions could be, for example, to what extend do the databases differ in their indexing quality, the currency of their records and the coverage of journal titles over time? Is the number of articles indexed from individual journals increasing, decreasing, constant or fluctuating? One approach to compare the different databases further could be based on the *breath indexed* suggested by Jacso (1994).

Further comparison of the overlap between the different databases is also needed on the article level, as the journal level just provides an upper boundary of the possible overlap between the different databases. For this reason future research should analyze the overlap between different databases at the article level as well as the indexing quality for common journals in different databases and the currency of the services. A next step in

[32]For ASAP the number of journal rises from 59 to 100; for ASP from 96 to 175; and for SSCI from 58 to 72.

assessing the different databases is therefore a comparison based on core journals in common to see which databases provide better coverage, currency and quality in indexing their articles.

Besides extending the analysis to the article level and quality level of the databases, further research should also try to extend the range of sources for journals. Even though the present study could identify journals of relevance to LIS from a great number of different countries some geographical regions are clearly underrepresented; for example, the numbers of journals from Russia and Asia seem quite low. Therefore at least two databases, one providing good coverage for Russian journals (see below) and one with better coverage of journals from Asia have to be included to give a more comprehensive picture of LIS journals worldwide. Extending the range of sources would also help to make the ranking of the journals more representative and stable. Further sources that could be included are, for example, ERIC,[33] published by the Department of Education in the US and used in previous studies, the section on LIS journals listed in the latest edition of Magazines for Libraries by Katz & LaGuardia (2005), the list of journals evaluated for 'Current Awareness Abstracts: Library and Information Management Literature', the LIS subsection of the Gale Trade and Industry database, and journals classified as LIS in SCOPUS®. For Russian journals including 'Referativnyi Zhurnal, Section 59 - Informatics' published by the All-Russian Scientific and Technical Information Institute of Russian Academy of Sciences (Vserossiisky Institut Nauchnoi i Tekhnicheskoi Informatsii – VINITI), which had been included in earlier studies, would be potentially fruitful.[34]

[33]ERIC can be accessed at: ►http://www.eric.ed.gov/

[34]More details on VINITI can be found at: ►http://www.viniti.ru/english/vinabout.html

7.5 Concluding Remarks

In summary, this study makes an important contribution in describing the landscape of secondary sources indexing the LIS journal literature. Even though, some limitations apply, the ranking approach and the novel method for investigating the overlap between different academic fields by looking at the number of shared journals are promising. The journal master list and its ranking is of potential interest for other researchers. Extending the number of secondary services to extend the list of identified journals and stabilize the ranking is desirable and future research will hopefully progress in this area.

A Glossary of Terms and Abbreviations

A&I

Is a common abbreviation for abstracting & indexing. In this thesis A&I refers to the producers of the different databases. However, it should be pointed out that A&I services already existed before the dawn of electronic databases, when they were published in print format. A&I services are used to cope with an increasing number of journal articles published. As the name says this is done by indexing and abstracting the content of journal articles, which enables the user of an A&I service to analyze the content of an article without having to read it first, thus enabling more targeted reading.

AHCI

Arts and Humanities Citation Index, an index of articles published in 'high profile' arts and humanities journals. It is maintained by Thomson Scientific and is now part of Thomson's Web of Science. The special feature of citation databases is that they can search cited references, thus enabling searches for articles that cite a specific work.

ASAP

The name of a multi-disciplinary literature reference database produced by Thomson Scientific. For a description, see chapter 4.1.8.

ASP

The name of a multi-disciplinary literature reference database produced by Ebsco. For a description, see chapter 4.1.9.

A Glossary of Terms and Abbreviations

Aslib

Aslib is the abbreviation for a library association in the United Kingdom; it stands for 'Association of Special Libraries and Information Bureaux'. Aslib also publishes internationally important journals in the area of LIS like the *Journal of Documentation* or the *Aslib Proceedings*. The homepage can be found at: ►http://www.aslib.co.uk

Bibliometrics

Refers to the metrics of quantifiable aspects of written communication which are of interest to the field of Information Science. An overview about the research in this area can in found at White & McCain (1989).

Citation Analysis

Citation Analysis is a method widely used in Bibliometric research. The basic idea is to analyze the way documents cite each other. As new documents cite documents that have already been written, the creation of an Citation Index is necessary to discover which (newer) documents reference a specific (older) document. For a literature review on Citation Analysis, see Nicolaisen (2007).

Citation Index

A Citation Index allows analysis of the citations to a specific text, in other words it enables discovery of where a specific text has been cited. In order to do this, the references in texts are put into an index which then is reversed. The first promotion of this idea for academic literature came from Garfield (1955) who established the first Citation Index in Science, the SCI. For an overview of other Citation Indexes, see Norris & Oppenheim (2007).

A Glossary of Terms and Abbreviations

Cybermetrics

see Webometrics. Also the name of an online journal.

eISSN

Used to identify the ISSN of the electronic version of a publication. See ISSN for explanation.

EZB

Abbreviation for 'Elektronische Zeitschriften Bibliothek', a directory of academic journals available in electronic form. For a description, see chapter 4.1.2.

File

In this thesis the term file refers to one of the databases being compared. The term is commonly used in the literature dealing with databases and probably stems from its usage by the database host Dialog®, which refers to its different databases as files.

IF

Short form for Impact Factor, see JIF.

Impact Factor

Is used in this study as synonym for Journal Impact Factor, see JIF.

INFODATA

The name of a literature reference database produced by the IZ Potsdam. For a description, see chapter 4.1.1.

Informetrics

Is defined as the metrics of Information Science. Therefore it subsumes all aspects of its subdisciplines such as Scientometrics, Bibliometrics and Webometrics. The first to use the term was Otto Nacke in 1979. The main general Journal of the area is a peer-reviewed journal established in 2007 called *Journal of Informetrics* (ISSN 1751-1577). An overview of research in this area can be found in Wilson (1999a).

ISI

Abbreviation for 'Institute for Scientific Information', which was established by Eugene Garfield. It is now part of Thomson Scientific.

ISSN

Stands for 'International Standard Serial Number', and is used to identify periodic publications by a unique number. It is a eight-digit number, separated after the forth digit by a dash, and used for periodicals either print or electronic format. More information on the ISSN can be found at ►www.issn.org. Some publications have different ISSN for their print and electronic formats. In order to be able to distinguish them *when necessary*, this study will use a small 'p' or 'e' in front of the ISSN to differentiate (pISSN; eISSN).

ISTA

Abbreviation for 'Information Science and Technology Abstracts', the name of a literature reference database produced by EBSCO. Formerly called ISA, which stood for 'Information Science Abstracts'. For a description, see chapter 4.1.7.

A Glossary of Terms and Abbreviations

JCR

Stands for 'Journal Citation Reports'. The JCR is published annually by Thomson Scientific (►http://scientific.thomson.com/products/jcr/). JCR provides various measures for a journal's importance, like the Journal Impact Factor, citation half-life, and immediacy index. The JCR for one year appears half way during the following year. So, for example, the JCR for 2006 appeared in July 2007.

JIF

Abbreviation, stands for 'Journal Impact Factor'. The JIF is a citation based measure of an journal, published by Thomson Scientific every year as part of the JCR. For details on how it is measured, see chapter 3.1.2.

Journal

In this study the term 'journal' subsumes all kinds of periodically published publications which might be of academic relevance and which bear ISSN numbers. This definition provided here is slightly wider than usual as it includes all kinds of serial publications. Publications without an ISSN were included if they met the criteria required to obtain an ISSN number. This means, for example, they had to be published periodically; for details, see ISSN (2003:8).

LIS

Abbreviation for 'Library and Information Science'.

A Glossary of Terms and Abbreviations

LISA

Abbreviation for 'Library and Information Science Abstracts', the name of a literature reference database produced by CSA. For a description, see chapter 4.1.4.

LISTA

Abbreviation for 'Library, Information Science and Technology Abstracts', the name of an literature reference database produced by EBSCO. For a description, see chapter 4.1.6.

Literature Reference Database

A literature reference database refers users to literature on specific topics. Its function is similar to library catalogs that refers users to books on specific subjects. However, literature reference databases also index the content of journals by assigning descriptors and abstracts to individual articles, thus enabling the researcher to assess papers dealing with specific topics. The databases usually do not contain the literature itself but simply refer to it. They are maintained by database producers and is usually not available free of charge.

LLIS

Abbreviation for 'Library Literature and Information Science', the name of a literature reference database produced by H.W. Wilson. For a description, see chapter 4.1.5

Open Access

Open Access in this study refers to journals that are available online without cost to readers.

pISSN

Used to identify the ISSN of the print version of a publication. See ISSN for explanation.

Scientometrics

Is the metric of quantifiable aspects of science of interest to the field of Information Science. The main journal in this area is called *Scientometrics* (ISSN 0138-9130).

SCI

Science Citation Index is an index of articles published in 'high profile' science and technology journals. It is maintained by Thomson Scientific and is part of Thomson's Web of Science. The special feature of citation databases is that they can search cited references, thus enabling searches for articles that cite a specific work.

Secondary Sources

A secondary source provides access to primary literature, such as monographs or journal articles, by indexing their content. Secondary sources appear usually as electronic literature reference databases. Before the advent of databases, secondary sources were published by Abstracting and Indexing services as print publications. Most databases can be tracked back to a previous print publication, for example, Library Science Abstracts as the predecessor of the database, Library and Information Science Abstracts.

Serial

In this study, the term 'serial' is used synonymously to 'journal'. See journal for more detail.

SSCI

Social Science Citation Index is an index of articles published in 'high profile' social sciences journals. It is maintained by Thomson Scientific and is part of Thomson's Web of Science. The special feature of citation databases is that they can search cited references, thus enabling searches for articles that cite a specific work.

Ulrich's

In this thesis, Ulrich's is used as the short form for Ulrich's Periodical Directory®.

Ulrich's Periodical Directory®

The Ulrich's Periodical Directory® is an comprehensive directory of periodical publications such as academic journals and magazines. It was first published in the 1930s to give an overview of a selected list of currently published periodicals; it has since emerged as a comprehensive source for those looking for specific journals. For a review on Ulrich's, see Jacso (1991). Ulrich's Periodical Directory is available on Dialog® under the file number 480 or online at: ►http://www.ulrichsweb.com

Web of Science

Name of an online product published by Thomson Scientific which makes it possible to combine the three citation databases SCI, SSCI, AHCI and to access other services, such as JCR.

Webometrics

Is the metric of quantifiable aspects of the Internet which are of interest to the field of Information Science. The main journal in this area is

called *Cybermetrics* (ISSN 1137-5019) which can be accessed free of charge online (►http://www.cindoc.csic.es/cybermetrics/). An overview about the research in this area can be found at Thewall, Vaughan, & Björneborn (2005).

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Journal Master List

The following section contains a complete list of all active LIS journals identified in this study. For every journal the journal title is given followed by primary and secondary ISSN for the publication. The primary ISSN usually, but not always, refers to a print publication and the secondary to a electronic version. Additionally the list includes the country of publication for each journal, details on a journals title history and publication language followed by the ISI Journal Impact Factor for those journals listed in the Journal Citations Report 2006. The following two columns indicate if a journal is peer-reviewed, and whether it is available under Open Access or not. The last column contains information on how many issues are published per year.

Addendum

Diese Magisterarbeit wurde mit dem ersten Preis für herausragende akademische Abschlussarbeiten des Vereins zur Förderung der Informationswissenschaft (VFI) 2008 ausgezeichnet. Für Details zu den Vergabekriterien siehe: http://www.ub.tuwien.ac.at/vfi/VFI_Preis.html

The VFI awarded this Master Thesis first prize for outstanding academic theses in 2008. Eligible for this award are academic theses in the area of Information Science from Germany, Switzerland and Austria. For details see (currently only in German): http://www.ub.tuwien.ac.at/vfi/VFI_Preis.html

Vergabe des VFI-Förderungspreises 2008

Gemäss den Regelungen[1] für die Vergabe des VFI-Förderungspreises wird bekanntgegeben:

zu §8(a)
Die Vergabekommission hat mit heutigem Datum über die Preisvergabe entschieden.

zu §6(b)
Die Kommission hat entschieden, in diesem Jahr einen ersten Preis, einen zweiten Preis und zwei dritte Preise zu vergeben. Folgende Arbeiten sollen prämiert werden:

1. Preis: Sebastian Böll (Deutschland)
A Scientometric Method to Analyze Scientific Journals as Exemplified by the Area of Information Science. Magisterarbeit, Univ. des Saarlandes, 2007.

2. Preis: Dr. Michael Katzmayr (Österreich)
Aufteilung des Erwerbungsbudgets und der Erwerbungskosten in Universitätsbibliotheken: Prinzipien wirtschaftlichen Handelns im Bestandsaufbau. Master-Thesis, Donau-Univ. Krems, 2008.

3. Preis (a): Jenny Oltersdorf (Deutschland)
RFID in Bibliotheken:Ökonomische, juristische und informationsethische Aspekte des Einsatzes von Radio Frequency Identification in Öffentlichen Bibliotheken. Magisterarbeit, Humboldt-Univ. zu Berlin, 2008.

3. Preis (b): Matthias Harbeck (Deutschland)
Das Massenmedium Comic als Marginalbestand im deutschen Bibliothekssystem? Analyse der Sammlungsstrategien und -absprachen in wissenschaftlichen und öffentlichen Bibliotheken. Master-Thesis, Humboldt-Univ. zu Berlin, 2008.

zu §5(b)
Die Kommission hat entschieden, das verfügbare Preisgeld von 2.000 Euro so aufzuteilen, dass auf den ersten Preis € 1.000, auf den zweiten Preis € 500 und auf die dritten Preise je € 250 Euro entfallen.

zu §6(c)
Die Kommission dankt allen Einreicherinnen und Einreichern für ihr Interesse am VFI-Förderungspreis. Sie hat ihre heutige Entscheidung einstimmig getroffen. Der erste Preis wird für eine Arbeit vergeben, in der einerseits der theoretische Stand zu einem Kernbereich der Informationswissenschaft kompetent und didaktisch ansprechend dargestellt wird und andererseits interessante methodische Ansätze empirisch verfolgt werden, wodurch sich auch eine solide Basis für weiterführende Forschungen ergibt. Mit dem zweiten Preis wird eine Arbeit prämiert, die einen bibliothekarischen Praxisbereich einer überzeugenden ökonomischen Analyse unterzieht. Die dritten Preise ergehen (a) an eine Arbeit, die eine aktuelle und zukunftsträchtige Technologie aus bibliothekarischer Sicht untersucht und dies in besonders übersichtlicher Weise darstellt, sowie (b) an eine Arbeit, die eine besonders originelle bibliothekarische Fragestellung engagiert und kenntnisreich analysiert.

zu §8(b)
Diese Entscheidung der Kommission wird vom Schriftführer des VFI allen Einsendern per E-Mail mitgeteilt. Die Verfasser/innen von Arbeiten, die für einen Preis vorgesehen sind, werden darüberhinaus auch schriftlich verständigt. Gegen die Entscheidung der Kommission kann gemäss §6(c) nicht berufen werden.

Die Vergabekommission:

Dr. O. Oberhauser M.Phil. M.Sc. MLIS (Vorsitz)
Mag. B. Bauer, Mag. B. Guba M.Sc., Mag. A. Hepperger M.Sc., Dipl.-Ing. R. Würzl

Wien, am 19. Januar 2009

[1] http://www.ub.tuwien.ac.at/vfi/VFI_Preis_Regelungen_2007.pdf

Please cite as follows:

Boell, Sebastian K. (2007). A Scientometric Method to Analyze Scientific Journals as Exemplified by the Area of Information Science. Saarbrücken : Saarland University, Information Science Master Thesis.